**细胞生物学B（双语）课程教学大纲**

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| 课程基本信息（Course Information） |
| 课程代码(Course Code) | BI307 | \*学时（Credit Hours） | 48 | \*学分（Credits） | 3 |
| \*课程名称(Course Name) | （中文）细胞生物学B（双语） |
| （英文）Cell Biology B (bilingual) |
| 课程性质(Course Type) | 必修课Required course |
| 授课对象(Audience) | 生命科学技术学院本科生Undergraduate Students of School of Life Sciences and Biotechnology |
| 授课语言(Language of Instruction) | 中文或英文Chinese or English |
| \*开课院系（School） | 生命科学技术学院School of Life Sciences and Biotechnology |
| 先修课程（Prerequisite） | 普通生物学、生物化学、微生物学General Biology, Biochemistry, Microbiology |
| 授课教师(Instructor) | 张大兵，王灿华Zhang Dabing, Wang Canhua | 课程网址(Course Webpage) |  |
| \*课程简介(Description) | **课程目标：**细胞生物学是研究细胞的结构与功能以阐明其生命活动基本规律的科学。本课程将从细胞的不同层次及细胞间的相互关系，让学生系统掌握细胞生物学的主要内容。既注重讲授细胞生物学的基础知识，又注意增添当今细胞生物学研究的最新成果，力求教学内容达到基础性、前沿性和新颖性的统一。**课程内容：**共分10章：细胞概述、细胞生物学研究方法、膜结构、膜运输、线粒体与叶绿体、细胞内区室及转运、细胞通讯、细胞骨架、染色体与细胞分裂周期和减数分裂、细胞群落（组织、干细胞与癌变）。涵盖了细胞生物学的三大结构体系：生物膜结构体系、细胞骨架结构体系、遗传表达结构体系。 |
| \*课程简介(Description) | **Course Objectives:**Cell biology is the study of the structure and function of cells. It clarifies the basic laws of the life activities. This course will helps students to master the main contents of cell biology from the different levels and the relationship of cells. It will teach not only pay attention to the basic knowledge of cell biology, but also the cutting-edge research of cell biology.**Course Introduction:**This course includes 10 chapters: Introduction to Cell, Research Method of Cell Biology，Membrane Structure, Membrane Transport, Energy Generation in Mitochondria and Chloroplasts, Intracellular compartments and transport, Cell signaling, Cytoskeleton, Chromosome and the cell division cycle and Meiosis, Cellular Communities (Tissues, Stem Cells, and Cancer). The course covers three major structure of the cell biology system: system of membrane structure, system of cytoskeleton structure and system of genetic expression structure. |
| 课程教学大纲（course syllabus） |
| \*学习目标(Learning Outcomes) | 1．**细胞概念和研究方法***主要培养学生的基础知识、研究能力、科学素养。*1. **介绍细胞：**了解细胞学说的核心内容；原核细胞核真核细胞的不同；不同模式生物细菌、酵母、植物、动物的代表物种。(**A3, A5.4.1, B5, B6**)
2. **研究方法：**重点掌握和强化各种光学显微镜的成像原理；电子显微镜的成像原理；免疫组化原理；流式细胞仪分选细胞的原理。一般掌握细胞工程技术。(**A3,A5.4.1, A5.3, B8, B6**)

**2.** **生物膜结构体系***主要培养学生的基础知识、科学素养、研究能力。*1. **膜结构：**重点掌握生物膜的结构特点；膜蛋白与脂双层的结合方式、功能。(**A3, A5.4.1, B2, B3, C4, B6**)
2. **膜运输：**重点掌握膜运输的基本原理；载体蛋白及其功能；离子通道和膜电位；一般掌握神经细胞的离子通道和信号转导。(**A3, A5.4.1, B5, B6, B2)**
3. **线粒体与叶绿体：**重点掌握线粒体和氧化磷酸化；电子传递与质子泵送的分子机制；叶绿体与光合作用；一般掌握线粒体和叶绿体的起源。(**A3, A5.4.1, B3, B6)**
4. **细胞内区室及转运：**重点掌握膜被细胞器；蛋白质分选；囊泡转运；分泌途径；胞吞途径。(**A3, A5.4.1, B7, B6, C3, C4)**
5. **细胞通讯：**掌握细胞信号传导的一般原理；G蛋白偶联受体；酶联受体。(**A3, A5.4.1, B4, B6)**

**3．细胞骨架结构体系***主要培养学生的基础知识、科学素养、研究能力。*1. **细胞骨架：**重点掌握染色质与染色体结构；中间丝；微管；肌动蛋白丝（微丝）；一般掌握肌肉收缩。(**A3, A5.4.1, B5, B6)**

**4．遗传表达结构体系***主要培养学生的基础知识、科学素养、研究能力。*1. **染色体与细胞分裂周期和减数分裂：**重点掌握染色体结构；细胞分裂周期概述；细胞周期控制系统；S期；M期；有丝分裂；胞质分裂；一般掌握细胞数量和细胞大小的控制。

重点掌握减数分裂。(**A3, A5.4.1, B5, B6)**1. **细胞群落：组织、干细胞与癌：**重点掌握胞外基质与结缔组织；上皮层和胞间连接；组织的维持和更新；癌。(**A3, A5.4.1, B6, C5)**

**1. Introduction to Cell and Research Method of Cell Biology** *Focus on basic knowledge, research ability and scientific literacy.*1. **Introduction to Cell:** Understanding of Discovery of Cell and Establishment of Cell Theory; The procaryotic cell; The eucaryotic cell; Model organisms. (**A3, A5.4.1, B5, B6**)
2. **Research Method:** Focus on Microscopic Imaging Technique; Cytochemical Technique; Cell Sorting. Understanding of Cell Engineering Technology. (**A3,A5.4.1, A5.3, B8, B6**)

**2. System of Membrane Structure***Focus on basic knowledge, scientific literacy, and research ability.*1. **Membrane Structure:** Focus on the lipid bilayer; Membrane protein. (**A3, A5.4.1, B2, B3, C4, B6**)
2. **Membrane Transport:** Focus on Principles of membrane transport; Transporters and their functions; Ion channels and the membrane potential. Understanding of Ion channels and signaling in nerve cells. (**A3, A5.4.1, B5, B6, B2)**
3. **Energy Generation in Mitochondria and Chloroplasts:** Focus on Mitochondria and oxidative phosphorylation: Molecular mechanisms of electron transport and proton pumping; Chloroplasts and photosynthesis. Understanding of the origin s of chloroplasts and mitochondria. (**A3, A5.4.1, B3, B6)**
4. **Intracellular compartments and transport:** Focus on Membrane-enclosed organelles; Protein sorting; Vesicular transport; Secretory pathways; Endocytic pathways. (**A3, A5.4.1, B7, B6, C3, C4)**
5. **Cell signaling:** Focus on General Principles of Cell Signaling; G-Protein-Coupled Receptors (GPCRs); Enzyme-Coupled Receptors. (**A3, A5.4.1, B4, B6)**

**3.** **System of Cytoskeleton Structure***Focus on basic knowledge, scientific literacy, and research ability.*1. **Cytoskeleton:** Focus on Intermediate filaments; Microtubules; Actin filaments; Understanding of Muscle contraction. (**A3, A5.4.1, B5, B6)**

**4.** **System of** **Genetic Expression Structure***Focus on basic knowledge, scientific literacy, and research ability.*1. **Chromosome and the cell division cycle:** Focus on Structure of Chromosome ; Overview of the cell cycle; The cell-cycle control system; S phase; M phase; Mitosis; Cytokinesis; Understanding of Control of cell number and cell size.

Focus on Meiosis. (**A3, A5.4.1, B5, B6)**1. **Cellular Communities (Tissues, Stem Cells, and Cancer)**: Focus on Extracellular matrix and connective tissues; Epithelial sheets and cell junctions; Tissue maintenance and renewal; Cancer. (**A3, A5.4.1, B6, C5)**
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| \*教学内容、进度安排及要求(Class Schedule&Requirement) |

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| **教学内容** | **学时** | **教学方式** | **作业及要求** | **基本要求** | **考查方式** |
| 第一章 介绍细胞 | 2 | 面授 | 习题 | 完成学习目标 | 作业期中考试 |
| 第二章细胞生物学的研究方法 | 6 | 面授及参观 | 习题 | 完成学习目标 | 书面作业PPT报告期中考试 |
| 第三章膜结构 | 3 | 面授 | 习题 | 完成学习目标 | 作业PPT报告期中考试 |
| 第四章膜转运 | 4 | 面授 | 习题 | 完成学习目标 | 作业PPT报告期中考试 |
| 第五章线粒体和叶绿体 | 4 | 面授 | 习题 | 完成学习目标 | 作业PPT报告期中考试 |
| 第六章胞内区室及转运 | 4 | 面授 | 习题 | 完成学习目标 | 书面作业PPT报告期中考试 |
| 第七章细胞通讯 | 6 | 面授 | 习题 | 完成学习目标 | 书面作业PPT报告期末考试 |
| 第八章细胞骨架 | 6 | 面授 | 习题 | 完成学习目标 | 作业PPT报告期末考试 |
| 第九章细胞周期、细胞分裂和减数分裂 | 6 | 面授 | 习题 | 完成学习目标 | 作业PPT报告期末考试 |
| 第十章细胞群落：组织、干细胞和癌 | 7 | 面授 | 习题 | 完成学习目标 | 期末考试 |

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| **Teaching contents** | **Credit Hours** | **Teaching Method** | **Assignments Requirements** | **Basic Requirements** | **Examination** |
| Chapter 1 Cells: The Fundamental Units | 2 | Contact studies  | Homework | Fulfill learning outcomes | HomeworkMidterm Exam |
| Chapter 2 Research Method of Cell Biology  | 6 | Contact studies and visits | Homework | Fulfill learning outcomes | Written homeworkPresentationMidterm Exam |
| Chapter 3 Membrane Structure | 3 | Contact studies | Homework | Fulfill learning outcomes | HomeworkPresentationMidterm Exam |
| Chapter 4 Membrane Transport  | 4 | Contact studies | Homework | Fulfill learning outcomes | HomeworkPresentationMidterm Exam |
| Chapter 5 Mitochondria and Chloroplasts  | 4 | Contact studies | Homework | Fulfill learning outcomes | HomeworkPresentationMidterm Exam |
| Chapter 6 Intracellular Compartments and Transport  | 4 | Contact studies | Homework | Fulfill learning outcomes | Written homeworkPresentationMidterm Exam |
| Chapter 7 Cell Communication  | 6 | Contact studies | Homework | Fulfill learning outcomes | Written homeworkPresentationFinal Exam |
| Chapter 8 Cytoskeleton  | 6 | Contact studies | Homework | Fulfill learning outcomes | HomeworkPresentationFinal Exam |
| Chapter 9 Cell Cycle, Cell Division and Meiosis | 6 | Contact studies | Homework | Fulfill learning outcomes | HomeworkPresentationFinal Exam |
| Chapter 10 Cellular Communities: Tissues, Stem Cells, and Cancer  | 7 | Contact studies | Homework | Fulfill learning outcomes | Final Exam |

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| \*考核方式(Grading) | 1. 课外作业 15%
2. 课堂报告 15%
3. 期中考试 35%
4. 期末考试 35%

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| 1. Homework 15%
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| 1. Presentation 15%
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| 1. Midterm Exam 35%
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| 1. Final Exam 35%
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| \*教材或参考资料(Textbooks & Other Materials) | **教材Textbooks**Bruce Alberts *et al*., ***Molecular Biology of the cell (fourth edition******)*,** Garland Science, 2014 **参考资料Other Materials**1. Harvey F. Lodish *et al*., ***Molecular Biology of the cell (sixth edition)***, Garland Science, 2015
2. ***Nature；Science；Cell***.
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| 其它（More） | 无 No |
| 备注（Notes） | 无 No |

备注说明：

1．带\*内容为必填项。

2．课程简介字数为300-500字；课程大纲以表述清楚教学安排为宜，字数不限。