**生物化学D课程教学大纲**

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| 课程基本信息（Course Information） |
| 课程代码（Course Code） | BI013 | \*学时（Credit Hours） | 48 | \*学分（Credits） | 3 |
| \*课程名称(Course Name) | （中文）生物化学D |
| （英文）Biochemistry D |
| 课程性质(Course Type) | 必修课Required course |
| 授课对象(Audience) | 药学院本科生Undergraduate Students of School of Pharmacy上海中医药大学本科生Undergraduate Students of Shanghai University of Traditional Chinese Medicine |
| 授课语言(Language of Instruction) | 中文Chinese |
| \*开课院系（School） | 生命科学技术学院School of Life Sciences and Biotechnology |
| 先修课程（Prerequisite） | 有机化学、普通生物学Organic Chemistry，General Biology |
| 授课教师(Instructor) | 王灿华Wang Canhua | 课程网址(Course Webpage) | 无 No  |
| \*课程简介(Description) | **课程目标：**生物化学是生命科学领域重要的专业基础课。课程的主旨是使学生系统地掌握现代生物化学的理论知识和实验原理，培养学生从分子水平认识生命现象的能力。课程既注重讲授生物化学的基础知识，又注意增添当今生物化学研究的最新成果，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9 章，涵盖了结构生物化学和代谢生物化学两大部分的主要内容。**结构生物化学：**绪论、蛋白质及研究技术、酶、 维生素与辅酶（自学）、核酸及研究技术。**代谢生物化学：**新成代谢总论与生物氧化、糖及糖代谢、脂及脂代谢、蛋白质降解和氨基酸代谢。  |
| \*课程简介(Description) | **Course Objectives:**Biochemistry is an important basic course in the field of life science. It is a discipline that studies the chemical composition, chemical changes of living organisms and the regulation of chemical changes in life. The purpose of the course is to let students master systematically the theoretical knowledge and experimental principle of modern biochemistry, cultivate students' ability of understanding life phenomena from the molecular level. The course 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 9 chapters. It covers two sections: structure biochemistry and metabolism biochemistry.**Structure Biochemistry**: Introduction, Protein and Research Technology, Enzymes, Vitamins and coenzymes (self-study), Nucleic Acid and Research Technology.**Metabolism Biochemistry**: Overview of metabolism and biological oxidation, Carbohydrates and glycometabolism, Lipids and lipid metabolism, Protein Turnover and Amino Acid Catabolism. |
| 课程教学大纲（course syllabus） |
| \*学习目标(Learning Outcomes) | 1．**结构生物化学***主要培养学生的基础知识、研究能力、科学素养。*1. **绪论：**了解生物化学的概念；生物化学与其它学科的关系；生物化学的研究方法；生物化学的发展简史; 生物化学的发展趋势。(**A3, A5.4.1, B5, B6, C6**)
2. **蛋白质及研究技术：**重点掌握蛋白质组成-氨基酸；蛋白质的一级结构；蛋白质的三维结构； 肌红蛋白与血红蛋白；蛋白质纯化和分析的基本技术。(**A3,A5.4.1, A5.3, B8, B6, C3, C4**)
3. **酶：**重点掌握酶的基本概念；酶促动力学；~~酶反应机制~~；酶调节机制。(**A3, A5.4.1, B5, B6, C3**)
4. **维生素与辅酶（自学）：**一般掌握水溶性维生素；脂溶性维生素。(**A3, A5.4.1, B5, B6, B7**)
5. **核酸及研究技术：**重点掌握核酸概念；核酸分类和功能；核酸结构；核酸研究技术。(**A3,A5.4.1, A5.3, B8, B6, C4, C3**)

**2. 代谢生物化学***主要培养学生的**基础知识、研究能力、科学素养。*1. **新成代谢总论与生物氧化：**重点掌握新成代谢总论；生物能学；生物氧化。(**A3, A5.4.1, B3, B5, B6, B7**)
2. **糖及糖代谢：**一般掌握糖的分类；结合糖（复合糖）。重点掌握糖酵解；葡萄糖异生途径；三羧酸循环；戊糖磷酸途径；糖原代谢。(**A3, A5.4.1, B5, B6, C2**)
3. **脂与脂代谢：**重点掌握脂肪酸；三种通用膜脂（磷脂、糖脂、胆固醇）；生物膜；脂肪酸的分解代谢；脂肪酸的合成代谢。一般掌握甘油三酯合成；胆固醇合成途径。(**A3, A5.4.1, B5, B6, B2**)
4. **蛋白质降解和氨基酸代谢：**重点掌握蛋白质的降解途径；尿素循环；氨基酸碳骨架分解代谢；一般掌握氨基酸的生物合成。(**A3, A5.4.1, B5, B6, B7**)

**1. Structure Biochemistry** *Focus on basic knowledge, scientific literacy, and research ability.*1. **Introduction:** Understanding of the concept of biochemistry；Biochemistry relationship with other disciplines；Research method of biochemistry; The brief develop history of biochemistry; The development of the biochemistry. (**A3, A5.4.1, B5, B6, C6**)
2. **Protein and Research Technique:** Focus on Protein composition-amino acid; Primary structure of protein; Three-dimensional structure of protein; Myoglobin and hemoglobin; Exploring Proteins: the essential purification techniques. (**A3,A5.4.1, A5.3, B8, B6, C3, C4**)
3. **Enzymes:** Focus on Basic concepts；kinetics; ~~Catalytic strategies~~; Regulatory strategies. (**A3, A5.4.1, B5, B6, C3**)
4. **Vitamins and coenzymes (self-study)**: Understanding of water-soluble vitamins; Fat soluble vitamins. (**A3, A5.4.1, B5, B6, B7**)
5. **Nucleic acid and Research Technique:** Focus on Introduction of nucleic acids; Classification and function of nucleic acids; Research technology of nucleic acids. (**A3,A5.4.1, A5.3, B8, B6, C4, C3**)

**2. Metabolism Biochemistry***Focus on basic knowledge, scientific literacy, and research ability.*1. **Overview of metabolism and biological oxidation:** Focus on Basic concepts of metabolism; Bioenergetics; Biological oxidation. (**A3, A5.4.1, B3, B5, B6, B7**)
2. **Carbohydrates and glycometabolism:** Understanding of Monosaccharides; Complex Carbohydrates (Oligosaccharides and polysaccharides). Focus on Glycolysis; Gluconeogenesis; Citric acid cycle; Pentose phosphate pathway; Glycogen metabolism. (**A3, A5.4.1, B5, B6, C2**)
3. **Lipids and lipid Metabolism:** Understanding of Fatty acids; Three common types of membrane lipids (phospholipids, cholesterol); Biomolecular sheet. Glycolipids. Focus on Fatty acid catabolism; Fatty acid anabolism. Synthesis pathways of triacylglycerols; Synthesis pathways of cholesterol. (**A3, A5.4.1, B5, B6, B2**)
4. **Protein Turnover and Amino Acid Catabolism:** Focus on the pathways of proteins degradation; Urea cycle; The catabolism of carbon atoms of amino acids. Understanding of The biosynthesis of amino acid. (**A3, A5.4.1, B5, B6, B7**)

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| \*教学内容、进度安排及要求(Class Schedule&Requirements) |

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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** |
| 第一章绪论 | 2 | 面授 | 习题 | 完成学习目标 | 作业 |
| 第二章蛋白质及研究技术 | 10 | 面授 | 习题 | 完成学习目标 | 书面作业PPT报告期中考试 |
| 第三章酶 | 6 | 面授 | 习题 | 完成学习目标 | 作业PPT报告期中考试 |
| 第四章维生素与辅酶（自学）  |  | 自学 | 习题 | 完成学习目标 | 作业期中考试 |
| 第五章核酸及研究技术 | 6 | 面授 | 习题 | 完成学习目标 | 书面作业PPT报告期中考试 |
| 第六章新成代谢总论与生物氧化 | 6 | 面授 | 习题 | 完成学习目标 | 书面作业PPT报告期末考试 |
| 第七章糖代谢 | 10 | 面授 | 习题 | 完成学习目标 | 作业PPT报告期末考试 |
| 第八章脂代谢 | 4 | 面授 | 习题 | 完成学习目标 | 作业PPT报告期末考试 |
| 第九章蛋白质降解和氨基酸代谢 | 4 | 面授 | 习题 | 完成学习目标 | 作业期末考试 |

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| **Teaching contents** | **Credit Hours** | **Teaching Method** | **Assignments Requirements** | **Basic Requirements** | **Examination** |
| Chapter 1Introduction | 2 | Contact studies  | Homework | Fulfill learning outcomes | Homework |
| Chapter 2Protein and Research Technique | 10 | Contact studies | Homework | Fulfill learning outcomes | Written homework; Presentation; Midterm Exam |
| Chapter 3Enzymes | 6 | Contact studies | Homework | Fulfill learning outcomes | Homework ; Presentation; Midterm Exam |
| Chapter 4Vitamins and coenzymes(self-study) |  | self-study | Homework | Fulfill learning outcomes | Homework; Midterm Exam |
| Chapter 5Nucleic Acid and Research Technology | 6 | Contact studies | Homework | Fulfill learning outcomes | Written homework; Presentation; Midterm Exam |
| Chapter 6Overview of metabolism and biological oxidation | 6 | Contact studies | Homework | Fulfill learning outcomes | Written homework; Presentation; Final Exam |
| Chapter 7Carbohydrates and glycometabolism | 10 | Contact studies | Homework | Fulfill learning outcomes | Homework; Presentation; Final Exam |
| Chapter 8Lipids and lipid Metabolism | 4 | Contact studies | Homework | Fulfill learning outcomes | Homework ; Presentation; Final Exam |
| Chapter 9Protein Turnover and Amino Acid Catabolism | 4 | Contact studies | Homework | Fulfill learning outcomes | Homework; Final Exam |

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| \*考核方式(Grading) | 1. 小测验 10%
2. 课堂报告 10%
3. 课外作业 10%
4. 期中考试 35%
5. 期末考试 35%

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| 1. Quiz 10%
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| 1. Presentation 10%
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| 1. Homework 10%
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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**

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|  王玮，王灿华：**《简明生物化学》**，科学出版社， 2012。 |

Wang Wei, Wang Canhua, **Concise Biochemistry,** Science Press, Beijing, 2012. **参考资料Other Materials**1. Jeremy Berg, John Tymoczko, Lubert Stryer. **Biochemistry, (Eighth Edition****).** W.H.Freeman and company, New York.2015.
2. David L. Nelson.W.H. Lehninger: **Principles of Biochemistry,** **(Seventh Edition).** Freeman and Company, 2017.
3. ***Nature; Science; Cell***.
 |
| 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。