课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	生物医学基础 Fundamentals in Biomedical Sciences
2.	**授课院系 Originating Department**	医学院 School of Medicine
3.	**课程编号 Course Code**	MED104
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	专业导论类/ Introduction to Majors
6.	**授课学期 Semester**	春季/ Spring
7.	**授课语言 Teaching Language**	中英双语 English & Chinese
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师） Instructor(s), Affiliation& Contact （For team teaching, please list all instructors）**	任欢，医学院； renh@sustech.edu.cn REN Huan, School of Medicine; renh@sustech.edu.cn
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	无 /NA
10.	**选课人数限额(可不填) Maximum Enrolment （Optional）**	

11.	授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other（Please specify）	总学时 Total
	学时数 Credit Hours	48	N/A	N/A	N/A	48

12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无/NA
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	无/NA
14.	其它要求修读本课程的学系 Cross-listing Dept.	无/NA

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

教学目的是为医学相关专业的本科生提供医学的重要基础--生命科学的基础知识。为学生进一步学习其它基础医学以及临床医学等学科奠定基础，灌输生物医学的全局观和独特视角。通过对现今医学问题和实例的讨论与分析，初步了解专业领域的发展趋势与专业运作机制与价值。

"Fundamentals in Biomedical Sciences" is a major fundamental course for undergraduate students who are majored in Medicine and related subjects. The aim is to introduce fundamental knowledge and information in Medicine and Biology, and to provide an overview and implant important concepts as fundamental essences that are beneficial for their further education in related courses. TBL-symposium focuses on hot topics and issue in current Bio-medicine field and industry and will promote student understanding on current trends, organization and reality.

16. 预达学习成果 Learning Outcomes

本课程完成后，学生将能够：

（1）掌握生命科学的基本知识；

（2）培养从生物学角度研究医学，或将生物学原理应用到医学研究和实践中去的认识；

（3）培养对后续医学和专业课程初步了解和认识；

（4）培养独立思考的能力和严谨求实的科学作风。

Learning outcome: the students will

(1) Understand basic information across modern life sciences;

(2) Briefly Know how to understand medicine in a biological point of view; and apply biological theories in medical care and practice;

(3) Briefly understand those subsequent medical courses or other major courses in their college education;

(4) Be trained on independent thinking, preciseness and factualism.

17. 课程内容及教学日历 （如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）
Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

第一章 绪论

1. 现代生命科学的发展
2. 新医科与新一轮科技革命和产业变革
3. 卓越医生培养计划 2.0 和医学教育新模式
4. 近代生命科学和医学的重大突破

Part 1: General Introduction

1. The development of modern life sciences
2. “New medicine” and the new generation of Science and Technology Revolution
3. Excellent Doctor Training Program 2.0 and new medical education
4. Breakthrough of modern biological sciences and Medicine

第二章 生物多样性

1. 物种的概念与生物的分类
2. 生物多样性的保护

Part 2: Diversity of living creatures

1. The concept of species and classification of living organisms
2. Protection of biodiversity

专题讨论 1：医学微生物：分离致病微生物以鉴别和挑选敏感性抗生素治疗；病原微生物的快速诊断（风疹、单纯疱疹、肝炎和艾滋病等）传染性疾病

TBL symposium 1：Microbiology 1）Isolation of pathogens for sensitive antibiotic treatment; 2) Lab test on infectious disease

第三章 细胞学基础

1. 细胞的基本特征和类型
2. 细胞的化学组成
3. 真核细胞的结构及其功能
4. 细胞是生命活动的基本单位

Part 3: Fundamentals of Cell biology

1. The features and types of cells
2. Chemical components of a cell
3. Structure and function of eukaryotic cells
4. Cell functional activities in living organisms

专题讨论 2：细胞学和组织病理学检测技术：肿瘤细胞和组织活检检测

TBL symposium 2：Detection and Classification of Cancer from Microscopic Biopsy Images

第四章 遗传的物质基础

1. 遗传的胚胎及细胞学基础
2. 遗传的分子基础
3. 基因组与生命组学
4. 人类遗传物质的改变

Part 4: Basics in Genetics

1. Genetics at the embryological and cellular levels
2. Genetics at the molecular level
3. Genomics and life omics
4. Changes in human genome

第五章 遗传与疾病

1. 遗传病概述
2. 遗传病的类型与遗传方式
3. 表观遗传与疾病
4. 遗传病的检测分析与干预

Part 5: Genetics and diseases

1. Introduction to genetic diseases
2. Types and modes of inheritance of genetic diseases
3. Epigenetics and disease
4. Analysis and therapy on genetic diseases

专题讨论 3：遗传病的诊断、组学技术和大数据分析在生物医学中的应用
TBL symposium 3：Diagnosis of Genetic dieases; Omics and Big data in Biomedical Sciences application.

第六章 生物信息传递与调控
1. 生物信息及其传递
2. 机体调控系统：神经系统、内分泌系统、免疫系统
3. 生物调控的细胞-分子基础
4. 生物对环境刺激的应答与调控反应
5. 生物应激与调控失衡与疾病

Part 6: Regulation and Adaptation of living organisms
1. Bioinformation and communication
2. Three biological regulation systems
3. Biological regulation at the molecular and cellular levels
4. Response and modulation on environmental stimuli
5. Stress and regulatory dysfunction related disease

专题讨论 4：免疫系统在健康中的重要作用；生物医药：疫苗与健康
TBL symposium 4：Immune system in health and disease; Vaccines and health.

第七章 生命起源与进化
1. 进化的基本含义与生物进化简史
2. 生物的微观进化与宏观进化
3. 生物进化的主要历程
4. 人类的起源与进化

Part 7: Origination and evolution of lives
1. Biochemical evolution and creatures at the early stage
2. Micro- and Macro-evolution
3. History of biological evolution
4. Origination and evolution of human beings

第八章 生物与环境
1. 生态学基础
2. 应用生态学

Part 8: Living organisms and their environment
1. The basics of Ecology
2. Applied Ecology

专题讨论 5：地球变暖和大气污染对人类健康的影响；生活环境和食品对健康的影响
TBL symposium 5：The effect of Global warming and Air pollution on health; Living environment- and food-borne diseases.

第九章 生命科学前沿与生物技术
1. 现代生命科学发展前沿
2. 生物技术在医学科学中的应用
3. 生命伦理学和安全性问题

Part 9: Frontiers in life sciences and biological technology
1. Frontiers in modern life sciences
2. Application of biological technology in medical sciences
3. Life ethics and safety in biological technology

专题讨论 6：1）合成生物学与影像学在生物医药中的应用；2）生物安全性与生命伦理学，近年来“科学崩坏”事件、论文造假与撤回等实例与分析
TBL symposium 6：1) Synthetic Biology and Imaging Technology in modern Medicine; 2) Examples in Bio-safety and Bio-ethics;

Team-based learning (TBL) is a structured form of small-group learning that emphasizes student preparation out of class and application of knowledge in class. Students are organized strategically into diverse teams of 5-7 students that work together throughout the class. Each TBL symposium includes processes such as pre-test and peer review, etc.

Section contents

Section	hr	Teaching Contents
lec1	2	绪论 & 生物的多样性 Introduction & Diversity of living organisms
TBL Symposium 1	4	医学微生物学：分离致病微生物以鉴别和挑选敏感性抗生素治疗；病原微生物的快速诊断（风疹、单纯疱疹、肝炎和艾滋病等）传染性疾病 TBL symposium 1：Microbiology 1）Isolation of pathogens for sensitive antibiotic treatment; 2) Lab test on infectious disease
lec2	2	细胞学基础 1—细胞的基本特征和类型 & 细胞的化学组成 Basics in cell biology-- The features and types of cells & Chemical components of a cell
lec3	2	细胞学基础 2 —真核细胞的结构及其功能 & 细胞是生命活动的基本单位 Basics in cell biology-- Structure and function of eukaryotic cells & Cell functional activities in living organisms
lec4	2	遗传的物质基础 1 – 胚胎及细胞学基础、分子基础及基因组与生命组学 Basics in Genetics 1 -- Genetics at the embryological and cellular levels and the molecular level, genomics and life omics.
lec5	2	遗传的物质基础 2 —人类遗传物质的改变; 遗传与疾病 1 —遗传疾病概述、遗传病的类型与遗传方式 Basics in Genetics 2 -- Changes in human genome; Genetics and diseases 1 -- Introduction to genetic diseases, types and modes of inheritance of genetic diseases
TBL Symposium 2	4	细胞学和组织病理学检测技术：肿瘤细胞和组织活检检测 TBL symposium 2：Detection and Classification of Cancer from Microscopic Biopsy Images
lec6	2	遗传与疾病 2— 表观遗传与疾病、遗传病的检测分析与干预 Genetics and diseases 2 -- Epigenetics and disease, analysis and therapy on genetic diseases
TBL Symposium 3	2	遗传病的诊断、组学技术和大数据分析在生物医学中的应用 Diagnosis of Genetic dieases; Omics and Big data in Biomedical Sciences application.
lec7	2	生物信息传递与调控系统 1 —生物信息及其传递 & 机体调控系统：神经系统 Bioinformatical transferring and modulation-- Bioinformation and communication & Regulation of nervous systems
lec8	2	生物信息传递与调控系统 2 —机体调控系统：内分泌系统、免疫系统 & 生物调控的细胞-分子基础 Bioinformatical transferring and modulation—Regulation of endocrine and immune systems & Biological regulation at the molecular and cellular levels
lec9	2	生物信息传递与调控系统 3 —生物对环境刺激的应答与调控反应 & 生物应激与调控失衡与疾病 Bioinformatical transferring and modulation-- Response and modulation on environmental stimuli & Stress and regulatory dysfunction related disease

lec10	2	生命的起源与进化 1 —进化的基本含义与生物进化简史 & 现代分子生物学对进化的解释 Origination and evolution of lives-- Biochemical evolution and creatures at the early stage & Explanation with modern molecular biology on evolution
lec11	2	生命的起源与进化 2 —生物进化的主要历程 & 人类的起源与进化 Origination and evolution of lives--History of biological evolution & Creationism and Evolutionism
TBL Symposium 4	4	免疫系统在健康中的重要作用；疫苗与健康 TBL symposium 4：Immune system in health and disease; Vaccines and health.
lec12	2	生物与环境 Living organisms and their environment
TBL Symposium 5	4	地球变暖和大气污染对人类健康的影响；生活环境和食品对健康的影响 TBL symposium 5：The effect of Global warming and Air pollution on health; Living environment- and food-borne diseases.
lec13	2	生命科学前沿与生物技术：现代生命科学发展前沿.生物技术在医学中的应用 Frontiers in modern life sciences and bio-technology -- Frontiers in modern life sciences; Application of biological technology in medical sciences
TBL Symposium 6	4	生物技术与生物安全：1）合成生物学与影像学在生物医药中的应用；2）生物安全性与生命伦理学，近年来“科学崩坏”事件、论文造假与撤回等实例与分析 1) Synthetic Biology and Imaging Technology in modern Medicine; 2) Examples in Bio-safety and Bio-ethics;
Final review and discussion		

18. 教材及其它参考资料 Textbook and Supplementary Readings

Text books:

曹新主编《生物医学导论》 第 2 版 2016; 人民卫生出版社；马建辉主编《医学导论》第 1 版 2015;人民卫生出版社；

Human Biology, 15th ed. McGraw-Hill Education; 2017;

课程评估 ASSESSMENT

19. 评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance		5		
课堂表现 Class Performance				
小测验 Quiz		15		
课程项目 Projects				
平时作业 Assignments		20		
期中考试 Mid-Term Test				
期末考试 Final Exam		30		
期末报告 Final Presentation				
其它（可根据需要改写以上评估方式） Others (The above may be modified as necessary)		30		TBL symposium

20. 记分方式 GRADING SYSTEM

☑ A. 十三级等级制 Letter Grading
☐ B. 二级记分制（通过/不通过） Pass/Fail Grading

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority

本课程已经医学院教学主任张文勇教授审核通过。