南方科技大学
SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

# 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.

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| 1. | 课程名称 Course Title | **Mathematics for Health Sciences** 医用高等数学 |
| 2. | 授课院系<br>Originating Department | Dept of Mathematics |
| 3. | 课程编号<br>Course Code | MA119 |
| 4. | 课程学分 Credit Value | 4 |
| 5. | 课程类别<br>Course Type | General Education (GE)Required Courses |
| 6. | 授课学期<br>Semester | Fall |
| 7. | 授课语言<br>Teaching Language | English |
| 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）<br>Instructor(s), Affiliation& Contact<br>（For team teaching, please list all instructors） | |
| 9. | 实验员/助教、所属学系、联系方式<br>Tutor/TA(s), Contact | To be announced |
| 10. | 选课人数限额(可不填)<br>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 | 64 | | | | 64 |

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

## 教学大纲及教学日历 SYLLABUS

**15. 教学目标 Course Objectives**

This course provides an intuitive understanding of basic mathematical knowledge for the students of Biomedical Science (Joint Educational Programme) .It focuses on the bases of the function, differentiation, integration and their principles, and theorems are explained. Specially, the calculus of on variable or several variables are introduced by many examples of their applications. It is significant that this course can help students to combine clinical medicine, practical pharmacy, and real-world biology with mathematics by problem-solving approaches, concise logical deduction style, and comprehensive applications.

**16. 预达学习成果 Learning Outcomes**

Master the necessary mathematical fundamentals, as well as the principles and theorems of function limits, differentiation, integration, etc. Having necessary mathematical and logical reasoning abilities, able to apply mathematical knowledge to the fields of medicine, pharmacy, and biology

**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.)**

Chapter 1: It introduced the linear and quadratic functions as the starting point, led in the concept of the function, and paid more attention to the bases of limit and continuity. At the same time, our writing made the students master limit theories concise and intuitive. Chapter 1 also opened the door of calculus and ran through the whole textbook. Some vivid mathematical examples were combined with the medicine, biology and pharmacology. These above were the typical features of this chapter.

Chapter 2: the students were not only worked on logical reasoning in mathematics, but also made the appropriate arrangement on the application of mathematics to medicine and life. What's more, the writing features were highlighted in detail, including mathematical keypoints, mathematical deduction and exercise type arrangement.

Chapter 3: Introduced the definitions, properties and calculation methods of both indefinite integral and definite integral, and discussed the differences and connections between them. It's pay more attention in the mathematical methods and applications to the geometric, physics, medicine, pharmacy and biology. Meanwhile, the course gave a reasonable arrangement of the exercises under comprehensive consideration of the difficulty and quantity.

Chapter 4: The three-dimensional spatial graphs and concept of derivative were directly transformed into each other, leading to both the definition of partial derivative and geometric interpretation of partial derivatives. What's more, the calculative method of double integrals was directly derived from double integrals over a rectangular region. These would make the students easily and intuitively understand the multivariate calculus, and greatly reduce the teaching hours to increase efficiency. The partial derivative, the extreme value theory of multivariate functions, the calculative method of double integrals and the method of linear regression equation of one variable were quickly highlighted, and then these important contents were applied directly to solve some problems on medicine, pharmacy and biology.

| Section | Topic |
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| 1 | Chapter 1 Functions, Limits and Continuity<br><br>1.1 Functions |
| 2 | 1.2 Limits of Function |
| 3 | 1.3 Continuity of Function |
| 4 | Chapter 2 Differentiation of One Variable<br><br>2.1 The Concept of Derivative |
| 5 | 2.2 Computations of Derivatives |
| 6 | 2.3 Compound Function and Its Chain Rule |
| 7 | 2.4 Second -Order Derivative and Differential |
| 8 | 2.5 Application of the Derivative |
| 9 | Midterm Examination |
| 10 | Chapter 3 Integration of One Variable<br><br>3.1 Indefinite Integration |
| 11 | 3.2 Definite Integration |

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| 12 | Chapter 4 Calculus of Several Variables<br><br>4.1 Functions of Several Variables |
| 13 | 4.2 Partial Derivatives |
| 14 | 4.3 Optimizing Functions of Two Variables |
| 15 | 4.4 Double Integrals |
| 16 | Review |

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

Advanced Mathematics for Medicine. ISBN 978-7-03-057637-8



**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 | | | | |
| 课堂表现 Class Performance | | | | |
| 小测验 Quiz | | 20 | | |
| 课程项目 Projects | | | | |
| 平时作业 Assignments | | | | |
| 期中考试 Mid-Term Test | | 30 | | |
| 期末考试 Final Exam | | 50 | | |
| 期末报告 | | | | |

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| **Final Presentation** | | | | |
| **其它（可根据需要改写以上评估方式）<br>Others (The above may be modified as necessary)** | | | | |

20. **记分方式 GRADING SYSTEM**

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| √ A. **十三级等级制 Letter Grading**<br>☐ 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**

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