General Mathematics

Module Information

2022.01, Approved

Summary Information

Module Code	3503YAUZOO
Formal Module Title	General Mathematics
Owning School	Biological and Environmental Sciences
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 3
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Yunnan Agricultural University

Learning Methods

Learning Method Type	Hours
Lecture	38
Practical	10

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-PAR	PAR	January	12 Weeks

Aims and Outcomes

Aims	This course is a common basic mathematics undergraduate course for all students. Through the study of this course, students should obtain the basic concepts, basic theories, and basic operation methods of univariate function limits and continuity, univariate function differentials, and univariate function integrals, etc., and lay a necessary foundation for follow-up courses and further acquired mathematical knowledge. The object of study in this course is function (quantity dependence in the process of change). Contents include functions, limits, continuous, one-variable function calculus, differential equations, etc. Through the teaching of this course, students will have a general understanding of the basic theory of calculus, and fully understand the background and mathematical ideas of calculus, master the basic methods and skills of calculus, and have certain ability in analysis and demonstration of computing. And also students can apply the methods of calculus to solve application problems.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Describe and recall functions, basic concepts of limits, proficient in calculations of limits, images of functions, properties of limits.
MLO2	2	Understand basic concepts of derivatives, proficient in the calculation of derivatives, and the application of derivatives.
MLO3	3	Understand basic concepts of indefinite integral and definite integral, proficient in calculation of indefinite integral and definite integral, application of integral.
MLO4	4	Understand and describe basic concepts of first-order and second-order differential equations, proficient in the calculation of first-order equations and second-order constant coefficient equations.

Module Content

Outline Syllabus	Section 1: Limits and continuity of functionsThis chapter requires students to learn the limits of series, the limits of functions, and the basic concepts and methods and applications of continuity of functions.Knowledge points include: real numbers; limits of sequences; properties of convergent sequences; criteria for convergence of sequences; monotonic bounded sequences; Cauchy convergence criteria; mappings and functions; limits of functions and their relationship with sequence limits; properties of function limits and operations The criteria for the existence of function limits; two important function limits; infinitesimal quantities, infinitesimal quantities, and comparisons; the concept and properties of function continuity; the discontinuities of functions; the properties of continuous functions on closed intervals; the uniform continuity of functions.Section 2: Differential Functions of Unary Functions and Their ApplicationsThis chapter requires students to learn basic concepts and basic methods and applications of functions such as derivatives, differentials and their basic theorems, and behaviour of functions.The basic knowledge points include: the concept of derivative; the meaning of derivative; the geometric meaning of derivative; the derivative of simple function; the algorithm of derivative; the derivative of inverse function, compound function and implicit function; the derivative of function determined by parametric equation; the relevant change rate Problems; Concepts of Differentiation; Differential Formulas and Algorithms; Simple Applications of Differentiation; Concepts of Higher Order Derivatives; Algorithms of Higher Order Derivatives; Extreme Values and Fermat's Theorem; Mean Value Theorem of Differentials; Lobeda's Law; Taylor Formula And its applications; monotonicity of functions; extreme values of functions; maximum and minimum values of functions; bumps of functions; inflection points of curves; asymptotic lines of functions; analytical methods of function mapping; Calculation; approximate solution of equation.Section 3: Unary Function Integrology and Its ApplicationsThis chapter requires students to learn the concepts and properties of indefinite integrals, definite integrals, and generalized integrals, and to master related calculations and applications.The knowledge points include: (1) the concept and nature of indefinite integrals; the basic formulas of indefinite integrals; the first type of integration method (miniature differential method); the second type of integration method; segment integration method; integration of rational functions; Integration of simple irrational functions; rational integration of trigonometric functions. (2) The concept of definite integral; the definition and geometric meaning of definite integral; the nature of definite integral. (3) Basic principles of calculus; partial integration method of definite integral; conversion integral method of definite integral; approximate calculation of definite integral. (4) Micro-element method; the problem of the area of the plane figure: the arc length of the plane curve; the parallel cross-sectional area is the volume of the known solid; the volume of the rotating body; the side area of the rotating body; the average value of the function; , Liquid side pressure. (5) Integral on infinite interval; Generalized integral of unbounded function; Examination and convergence method of integral on infinite interval; Examination and convergence criterion of integral of unbounded function; Γ function.Section 4: Differential EquationsThe knowledge in this chapter is mainly calculation, and students are required to master the solving problems of various differential equations in this chapter.Basic knowledge points: basic concepts of differential equations, differential equations with separable variables, homogeneous equations, first-order linear differential equations, Bernoulli equations, lower-ord
Module Overview	
Additional Information	This course is a foundation level general mathematics course that requires students to understand the concepts and properties of functions, limits, derivatives, differentials, indefinite integrals, definite integrals, and applications of definite integrals, master the corresponding basic calculation methods and skills, and be able to solve simple practical problems.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Exam	Written exam	60	2	MLO1, MLO2, MLO3, MLO4
Test	Coursework Test	40	0	MLO1, MLO2, MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Rachael Symonds	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings