

## COURSE SPECIFICATION DOCUMENT

<b>Academic School / Department:</b>	Richmond Business School
<b>Programme:</b>	Accounting and Finance Economics Finance & Investment
<b>FHEQ Level:</b>	4
<b>Course Title:</b>	Calculus with Applications
<b>Course Code:</b>	MTH 4000
<b>Student Engagement Hours:</b>	120
Lectures: Seminar / Tutorials:	45
Independent / Guided Learning:	75
<b>Semester:</b>	Fall, Spring, Summer
<b>Credits:</b>	12 UK CATS credits 6 ECTS credits 3 US credits

### **Course Description:**

This course provides a sound understanding of the concepts of calculus and their applications to business and economics. Emphasis is provided in providing the theory side by side with practical applications and with numerous examples. Topics include co-ordinate geometry of straight lines, quadratic curves, exponential and logarithmic functions; elementary differentiation and integration; and applications to maxima, minima, and optimization. It also deals with differentiation and integration of trigonometric and inverse trigonometric functions.

### **Prerequisites:**

MTH 3111 Functions with Applications

### **Aims and Objectives:**

To provide students with an understanding of the fundamentals of calculus and their applicability. To give students the opportunity to investigate a range of mathematical applications in areas of business and economics as well as social and life sciences

**Programme Outcomes:**

Economics: D

Finance and Investment: A4, B3, B4, C1, C2, D5

Accounting and Finance: B2, C1, D2

A detailed list of the programme outcomes is found in the Programme Specification. This is maintained by Registry and located at: <https://www.richmond.ac.uk/programme-and-course-specifications/>

**Learning Outcomes:**

By the end of this course, successful students should be able to:

- Have a sound and broad understanding of functions; understand the idea of limits and continuity and have the ability to calculate and apply them.
- Have a broad understanding of the concepts and processes of the differentiation and integration of functions of one variable, including geometrical interpretations.
- Have an understanding of calculus of several variables including partial derivatives, optimization of functions of two variables, Least-Square methods, Lagrange Multipliers and double integrals.
- Be able to choose the correct method/strategy to solve business oriented problems using appropriate mathematical language.

**Indicative Content:**

- Functions and Functional Models
- Limits and Continuity; L'Hopital's Rule
- The Derivative and techniques of differentiation
- Application of the derivative
- Indefinite and definite integral
- Functions of several variables and partial derivatives
- Least-Square method
- Optimization of functions of two variables and the method of Lagrange Multipliers
- Double integrals

**Assessment:**

This course conforms to the University Assessment Norms approved at Academic Board and located at: <https://www.richmond.ac.uk/university-policies/>

**Teaching Methodology:**

Course material is presented and analysed in the following ways:

- a) Formal presentation of topics and worked exercises.
- b) Self-learning assignments and directed mathematical exercises.
- c) Participation in individual and group investigations.
- d) Where appropriate, students will be introduced to solution aids, such as hand-held calculators, mathematical tables and computer software.

**Indicative Text(s):**

Laurence Hoffmann, Gerald Bradley, David Sobeki and Michael Price, "Applied Calculus for Business, Economics, and the Social and Life Sciences", 11th ed., McGraw-Hill, 2012.

Margaret Lial, Raymond Greenwell and Nathan Ritchey, "Calculus with Applications", 11th ed., Pearson, 2016

See syllabus for complete reading list

**Change Log for this CSD:**

Nature of Change	Date Approved & Approval Body (School or AB)	Change Actioned by Registry Services
Course description	27th Nov 17	Y
Aims and objectives	27th Nov 17	
Learning outcomes	27th Nov 17	
Indicative content	27th Nov 17	
Indicative Text	Sept 2019	
Various updates as part of the UG programme review	AB JAN 2022	