COURSE SPECIFICATION DOCUMENT

Academic School/Department:	Richmond Business School
Programme:	Combined Studies
***FHEQ* Level:**	6
Course Title:	Advanced Differential Calculus
Course Code:	MTH 6102

Total Hours:	**160**
Timetabled Hours:	45
Guided Learning Hours:	15
Independent Learning Hours:	100

Credits:

16 UK CATS credits
8 ECTS credits
4 US credits

Course Description:

This course provides an introduction to differential and integral calculus of several variables, functions of complex variables, ordinary and partial differential equations, infinite series and convergence, Fourier and orthogonal functions. Analysis of linear differential equations, non-homogeneous, boundary value problems, various methods of solving differential equations e.g. separation of variables, variation of parameters, Laplace transform, Inverse transforms, Power Series solutions and Fourier series. Methods studied will be shown how they can be applied to problem in business, finance and economics.

Prerequisites:

MTH 4110

Aims and Objectives:

The course provides students with an understanding of a number of topics and concepts in differential and integral calculus, differential equations and their applications. The course aims to build upon what students have covered in earlier courses of calculus, and to encourage them to develop interest in the subject and pursue other courses that require these skills.

Programme Outcomes:
Combined Studies: Aii, Aiv, Bi, Bii, Biii, Ci, Ciii, Dii

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 differential and integral calculus of several variables and functions of complex variables.
- Have a sound and broad understanding of solving different forms of ordinary and partial differential equations, Fourier and orthogonal functions, non-homogeneous and boundary value problems.
- Have a sound and broad understanding of various methods of solving differential equations such as separation of variables, variation of parameters, Laplace transform, Inverse transforms, Power Series solutions and Fourier series.
- Be able to apply and solve problems applicable to business, finance and economics.

Indicative Content:
- Differential and Integral Calculus
- Calculus of Several Variables
- Functions of Complex Variables
- Fourier and Orthogonal Functions
- Non-homogeneous and Boundary-Value Problems
- Methods of Solving Differentiall Equations
- Applications to Business, Finance and Economics

Assessment:
This course conforms to the University Assessment Norms approved at Academic Board.

Teaching Methodology:
This course will be taught through a combination of lectures and problem solving-type activities, including group work, sub-group activities, and classroom discussion.

The general approach to classes is informal, and discussion is viewed as an essential part of an interactive and participatory learning program. Audio-visual aids, study materials and electronic learning resources will be used as appropriate and where and when needed.

Lectures provide a framework for the course, and are designed to ensure students have an overview of main issues and concerns on a particular topic, receive clarification on the major points of debate understand the broad dimensions of core problems, and are aware of relevant literature in the specific area of concern. It is essential that lectures are supplemented with assigned readings; together, the readings and the lectures are designed to provide guidance for class discussion and directed problem-solving tasks. Students will be introduced to computer software for symbolic language manipulation e.g. Mathematica, Maple or Math World for a more robust approach to concept applications and analysis of functions.

Bibliography:

See syllabus for complete reading list

Indicative Text(s):

Earl D. Rainville, Phillip E. Bedient and Richard E Bedient, "*Elementary Differential Equations*", 6/e, Prentice Hall, 2010

Wilfred Kaplan, "*Advanced Calculus",* 5/e, Addison-Wesley, 2011

Journals

IMA Journal of Mathematics and It's Applications

Web Sites

Please Note: The core and the reference texts will be reviewed at the time of designing the semester syllabus

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Change Log for this CSD:

Nature of Change	Date Approved & Approval Body (School or AB)	Change Actioned by Academic Registry

Pre-requisite Change: Replacement of MTH 5140 or MTH 5110 with MTH 4110	By email 12.1.2018	
Annual update	May 2023	
Total Hours Updated	April 2024	