COURSE SPECIFICATION DOCUMENT

Academic School/Department: Business and Economics

Programme: Combined Studies

***FHEQ* Level:** 5

Course Title: Calculus with Analytic Geometry

Course Code: MTH 5110

Course Leader: David M Munyinyi

Student Engagement Hours: 160
Lectures: 45
Seminar / Tutorials: 15
Independent / Guided Learning: 100

Semester: Spring

Credits Points: 16 UK CATS credits
8 ECTS credits
4 US credits

Course Description:
This Course provides a detailed coverage of the analytical and geometrical properties of exponential functions, logarithmic functions, hyperbolic functions; complex numbers; Taylor-MacLaurin expansion; methods of integration; infinite series; and co-ordinate geometry of the conic sections and calculus of functions of several variables to include partial derivatives, solving linear differential equations of first order; multiple integrals, Jacobians, line and surface integrals and the theorems of Green and Stokes; and continuity and analyticity of functions of complex variables.

Prerequisites: MTH 4110

Aims and Objectives:
This Course aims to provide students with an understanding of the fundamentals of calculus, their applicability and historical developments. A primary aim of this course is to lay a broad and solid foundation for various aspects of functions, limits, derivatives and integrals. This course will also deal with solving linear differential equations of first order and the calculus of functions of

several variables to include partial derivatives, multiple integrals, Jacobians, line and surface integrals and the theorems of Green and Stokes, continuity and analyticity of functions of complex variables.

Programme Outcomes:
Combined Studies: Aii, Aiii, Bi, Ci, Cii, Ciii, Di, 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:

- Has a detailed knowledge of the theoretical foundations of functions, differentiation and integration and demonstrate evidence of basic competence in solving theoretical problems based on analytical properties.

- Apply the theoretical knowledge to specific applications and demonstrate ability to solve application-oriented problems and obtain optimal solutions in continuous systems.

- Be able apply differential and integral calculus to explore more complex ideas such as applying the principles of the Jacobians to line and surface integrals and Green's and Stokes' theorems.

Indicative Content:

Inverse functions (algebraic, exponential, logarithmic and trigonometric). Derivatives of inverse functions.
Hyperbolic functions and their derivatives. Methods of integration.
Applications of integration to area and solids of revolutions.
Applications of integration to solve simple differential equations. Geometry of conic sections and polar coordinates.
Infinite series and sequences.
Functions of several variables and partial derivatives.
Line integrals, Green's theorem, surface integrals, the divergence theorem, and Stokes's theorem.
Algebra of complex numbers, geometrical representation and Euler identity.
Complex roots of quadratic equations, cube roots of unity, Argand diagram.
Complex- valued functions and applications.

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

Teaching Methodology:
The Course will consist of interactive learning sessions of material presented on white board and using PowerPoint slides to clarify concepts that require graphics, small group discussions, and individual project if applicable.

Bibliography:

IndicativeText(s):
Thomas, G.B., "*Calculus*", Pearson, 2010, 12th Edition.

Journals

Web Sites
American Mathematical Society
http://www.ams.org/home/page

London Mathematical Society
http://www.lms.ac.uk/

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:

Major or Minor Change ?	Nature of Change	Date Approved & Approval Body (School or LTPC)	Change Actioned by Academic Registry