DEREE COLLEGE SYLLABUS FOR:	US CREDITS: 3/1/3

MA 2205 APPLIED CALCULUS
(Previously MA 1105)
(Spring 2019)

UK LEVEL: 4
UK CREDITS: 15

PREREQUISITES:	Placement test **or** MA1022 Intermediate Mathematics MA 1108 College Algebra
CATALOG DESCRIPTION:	Functions, limits and continuity. Derivative of polynomials, and rational, exponential and logarithmic functions. Sketching the graph of a function. Indefinite and definite integral. Integration techniques. Area as an integral. Functions of several variables. Partial derivatives of first and second order. Application of differentiation and integration to problems in business, economics, and related fields.
RATIONALE:	A course in mathematics that offers an introduction to calculus and its applications to the solution of problems arising in business, economics, and related fields. It does not overlap with or duplicate any other course.
LEARNING OUTCOMES:	1. Apply the differentiation rules to polynomial, rational, exponential and logarithmic functions. 2. Apply differentiation rules to solve marginal analysis problems and to optimize functions arising in business, economics and related fields. 3. Apply the integration rules to evaluate indefinite and definite integrals. 4. Apply integration rules to solve problems related to applications in business, economics and related fields. 5. Show understanding of the concept of a function of two variables and calculate the first and the second order partial derivatives. 6. Solve optimization problems involving functions of two variables.
METHOD OF TEACHING AND LEARNING:	In congruence with the teaching and learning strategy of the college, the following tools are used: ➤ Classes will consist of lectures where the concepts of the course will be introduced. Their application to the solution of problems arising from business, economics and related fields will be illustrated through several examples. Coursework will be regularly assigned and discussed in class with students actively participating in the discussion. Computer software will be available both as a teaching aid and as the medium for solving problems. ➤ Office hours: students are encouraged to make full use of the office hours of their instructor, where they can ask questions, see their exam paper, and/or go over lecture material. ➤ Use of a blackboard site, where instructors post lecture notes, assignment instructions, timely announcements, as well as additional resources.
ASSESSMENT:	Summative: <table><tr><td>Midterm Examination</td><td>**40%**</td></tr><tr><td>Final Examination</td><td>**60%**</td></tr></table> **Formative:** <table><tr><td></td><td>**0%**</td></tr></table> The formative, a 1-hour in-class examination, aims to prepare students for the examinations. The midterm examination is a 1-hour common examination. Learning outcomes 1, 2 The final examination is a 2-hour common and comprehensive examination. Learning outcomes (1, 2), 3, 4, 5, 6

INDICATIVE READING:	**REQUIRED READING:** Hoffmann, Laurence, Bradley Gerard, Sobecki Dave and Price Michael Calculus for Business, Economics and the Social and Life Sciences, International Edition McGraw Hill, © 2013 Edition. **RECOMMENDED READING:** • Instructor's hand-outs. • Books on reserve in the library.
INDICATIVE MATERIAL: *(e.g. audiovisual, digital material, etc.)*	**REQUIRED MATERIAL:** **RECOMMENDED MATERIAL:** • College Mathematics • Mathematics Magazine • American Mathematical Monthly
COMMUNICATION REQUIREMENTS:	Verbal presentation skills using academic / professional English.
SOFTWARE REQUIREMENTS:	Any software distributed with the course textbook.
WWW RESOURCES:	http://en.wikipedia.org/wiki/Portal:Mathematics http://mathworld.wolfram.com http://mathacademy.com

INDICATIVE CONTENT:	**1. Graphs, and Limits**
	   1.1. Functions
	   1.2. The graph of a functions
	   1.3. Linear functions
	2. Differentiation: Basic Rules
	   2.1. Introduction of the derivative as a limit
	   2.2. Rules of differentiation
	   2.3. Higher-order derivatives
	   2.4. The chain rule
	   2.5. Marginal analysis and approximations using increments
	   2.6. Implicit differentiation and related rates
	3. Additional Applications of the Derivative
	   3.1. Increasing and decreasing functions; relative extrema
	   3.2. Concavity and points of inflection
	   3.3. Curve sketching
	   3.4. Optimization
	4. Exponential and Logarithmic Functions
	   4.1. Differentiation of exponential and logarithmic functions
	5. Integration
	   5.1. Antidifferentiation: The indefinite integral
	   5.2. Integration by substitution
	   5.3. The definite integral and the fundamental theorem of calculus
	   5.4. Applying definite integration: Area between curves and average value
	   5.5. Additional applications to business and economics
	6. Calculus of Several Variables
	   6.1. Functions of several variables
	   6.2. Partial derivatives
	   6.3. Optimizing functions of two variables
	   6.4. Constrained optimization: The method of Lagrange multipliers