Subject Description Form

Subject Code	AMA251
Subject Title	Further Calculus
Credit Value	3
Level	2
Pre-requisite/ Co-requisite/ Exclusion	Pre-requisite: Calculus (AMA140 or AMA150)
Objectives	This subject is to provide an introduction to two variable calculus and the basic theory of ordinary differential equations and their applications to solving problems in sciences and engineering. This subject is a continuation of AMA150. It introduces the concepts and skills of calculus of functions of several variables. It is of essential importance in disciplines such as multivariate statistics, differential equations, financial mathematics and optimization. The emphasis will be on the basic understanding of the concepts, techniques and applications.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: 1. discuss the concepts of limit and continuity; 2. develop the understanding of partial derivative and its geometric meaning, and compute derivatives using appropriate rules of differentiation; 3. apply differential calculus to calculate rates of change, locate local extrema and approximate Δf by the total differential of f; 4. apply the idea of Lagrange Multiplier to constrained optimization problems; 5. develop the concept of multiple integral and evaluate multiple integrals by iterated integrals; 6. evaluate multiple integrals by the Change of Variables Formula; 7. apply multiple integration to problems in geometry and physics.
Subject Synopsis/ Indicative Syllabus	*Differential Calculus for functions of several variables*: *(21 hours)* Partial derivatives, total differential, chain rule, Taylor's Formula, relative extrema, Lagrange multipliers, applications. *Multiple Integrals: (21 hours)* Multiple integral for function of two variables; change of variables, geometric and physical applications.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The lectures aim to further development students' understanding and skills in calculus with AMA150 as a basis. The emphasis will be on the differential and integral calculus for functions of several variables. Applications on geometry, statistics, physics and engineering will also be addressed.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						
		1	2	3	4	5	6	7
a. Assignments/Quizzes	20%	✓	✓	✓	✓	✓	✓	✓
b. Tests	20%	✓	✓	✓	✓			
c. Examination	60%	✓	✓	✓	✓	✓	✓	✓
Total	100 %							

Continuous Assessment comprises of assignments and/or quizzes, and tests. A written examination is held at the end of the semester.

To pass this subject, students are required to obtain Grade D or above in **both** the Continuous Assessment and the Examination components.

Student Study Effort Required

Class contact:	
▪ Lecture	28 Hrs.
▪ Tutorial and Student Presentations	14 Hrs.
Other student study effort:	
▪ Assignment	33 Hrs.
▪ Self-study	33 Hrs.
Total student study effort	108 Hrs.

Reading List and References

Textbook:

Stewart, James	Calculus 7th ed.	Brooks Cole Cengage Learning, c2012

References:

Stein, S.K. & Barcellos, A.	Calculus and Analytic Geometry 5th edition	McGraw Hill 1992
Thomas, G.B., Weir, M.D. & Hass, J.R.	Thomas' Calculus 12th edition	Addison Wesley 2009