COURSE SPECIFICATION FORM

DEPARTMENT OF: Mathematics				**Academic Session: 2017-18**	
Course Code:	MT1720	**Course Value:**	0.5	**Status:** *(ie:Core, or Optional)*	Mandatory for all programmes
Course Title:	Functions of Several Variables			**Availability:** *(state which teaching terms)*	Term 2
Prerequisites:	MT1710			**Recommended:**	
Co-ordinator:					
Course Staff					
Aims:	This course aims to introduce students to the calculus of functions of more than one variable, and show how it may be used in such areas as geometry and optimization, and to demonstrate how simple functions may be represented as a power series under certain conditions.				
Learning Outcomes:	On completion of the course, students should be able to • manipulate partial derivatives; • use partial derivatives to determine the nature of stationary points and to analyse certain properties of surfaces; • construct and manipulate line integrals; • evaluate double integrals, including the use of change of order of integration and change of coordinates; • expand functions such as e^x, trigonometrical and hyperbolic functions, $\ln(1+x)$, $\arctan x$ and simple variants as power series; • generate Taylor and Maclaurin series, including the remainder terms.				
Course Content:	**Partial differentiation:** partial derivatives (using Mathematica to check), exact first order differential equations; chain rule for differentiation; stationary points; use of Mathematica for visualization; geometry: gradient, directional derivative, normals, tangents. **Applications of calculus:** intuitive notions of continuity and differentiability, intermediate value theorem, Rolle's theorem and mean value theorem, all stated without proof but illustrated by examples; l'Hôpital's rule. **Series:** idea of a power series, Taylor and Maclaurin series; binomial, geometric, exponential, sin and cos, $\ln(1+x)$, $\arctan x$. Remainder terms (one type only). **Integration in more than one dimension:** curves in three dimensions: parametric equations, distance along a curve; line integrals; line integral of a gradient; double integrals; use of Mathematica; change of order; change of variables, Jacobian; plane polar coordinates.				
Teaching & Learning Methods:	33 hours of lectures and examples classes, 11 hours of problem workshops. 106 hours of private study, including work on problem sheets and examination preparation. This may include discussions with the course leader if the student wishes.				
Key Bibliography:	Calculus (5th edition) – J Stewart (Brooks-Cole 2003). *Library Ref. 515 STE*				
Formative Assessment & Feedback:	Formative assignments in the form of 10 problem sheets. The students will receive feedback as written comments on their attempts.				
Summative Assessment:	**Exam** (%) A two-hour paper: 90% **Coursework** (10%) Attempting problem sheets				

Updated September 2017