COURSE SPECIFICATION FORM

DEPARTMENT OF: Mathematics				Academic Session: 2017-18	
Course Code:	MT1710	**Course Value:**	0.5	**Status:**	Mandatory for all programmes
Course Title:	Calculus			**Availability:** *(state which teaching terms)*	Term 1
Prerequisites:	A-level Mathematics or equivalent			**Recommended:**	
Co-ordinator:					
Course Staff					
Aims:	This course aims to develop the students' confidence and skill in dealing with mathematical expressions, to extend their understanding of calculus, and to introduce some topics which they may not have met at A-level. It also aims to ease the transition to university work and to encourage the student to develop good study skills. Mathematica is to be used as a calculating and graphical aid.				
Learning Outcomes:	On completion of the course the student should be able to: • factorize polynomials and separate rational functions into partial fractions; • sketch the graphs of polynomials, rational functions and other elementary functions, identifying turning points and asymptotes where appropriate; • differentiate commonly occurring functions, and find indefinite and definite integrals of a wide variety of functions, using substitution or integration by parts; • recognize the standard forms of first-order differential equations, reduce other equations to these forms, and solve them; • solve certain second and higher order differential equations; • demonstrate that he or she can use Mathematica as an aid in the solution of problems or to illustrate the ideas met in the course.				
Course Content:	**Polynomials and rational functions:** asymptotes, sketching, differentiation. **Transcendental functions:** e^x, $\ln x$, trigonometric and hyperbolic functions (differentiation, zeros, turning points, sketching, symmetry, periodicity). **Calculus:** chain rule, integration by parts, substitution, use of trigonometric formulae, partial fractions. **First-order differential equations:** separable equations, linear equations. **Second-order differential equations:** constant coefficients, complementary function and particular integral. **Use of the Mathematica package:** including polynomials, integrals and derivatives, plots, and general applications to many of the above topics.				
Teaching & Learning Methods:	33 hours of lectures and examples classes, 11 hours of problem workshops, 3 hours of Mathematica training, 103 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* Elementary Differential Equations and Boundary Value Problems – W E Boyce & R C di Prima (Wiley). *Library Ref. 515.41 BOY*				
Formative Assessment & Feedback:	Formative assignments in the form of 11 problem sheets. The students will receive feedback as written comments on their attempts.				
Summative Assessment:	**Exam** (%) A two-hour paper: 80% **Coursework** (20%) Attempting problem sheets: 10%; one 45 minute test in January: 10%.				