COURSE SPECIFICATION FORM

DEPARTMENT OF: Mathematics				**Academic Session: 2017-18**	
Course Code:	MT1940	**Course Value:**	0.5	**Status:** *(ie:Core, or Optional)*	Mandatory for G100, G103, G1G3 and Mathematics majors
Course Title:	Numbers and Functions			**Availability:** *(state which teaching terms)*	Term 1
Prerequisites:	A-level Mathematics or equivalent			**Recommended:**	None
Co-ordinator:					
Course Staff					
Aims:	• To kindle an interest in analysis, and to provide a taste of what the subject is about; • To give a user-friendly introduction to key ideas of analysis, illustrated with copious examples; • To provide a structure that enables students to gain confidence in handling concepts in analysis.				
Learning Outcomes:	On completion of the course, the student should be able to: • appreciate the significance of the completeness property distinguishing **R** from **Q**; • find sups and infs of elementary sets; • find out whether a given (simply defined) function is continuous at a point, and apply properties of continuous functions in examples; • determine whether a given (simple) sequence tends to a limit, using monotonicity when appropriate; • find limits of sequences defined recursively.				
Course Content:	**The real number system:** The natural numbers N, the binomial theorem using induction. The integers Z and the rational field Q. Order properties, manipulation of inequalities, the triangular inequality. Irrationality of $\sqrt{2}$. Decimal representation of real numbers. Null sequences. Subsets, maximum, upper bound, least upper bound. Every non-empty subset of the reals which is bounded above has a least upper bound. Bernoulli's inequality with applications. **Continuity:** Discussion of continuity, continuity of *f* at a point. A continuous function is specified by its values at rational points. Discussion of $f(x) = 2^x$. Continuity on an interval. A continuous function on a closed interval. Discussion of the intermediate value theorem . **Sequences:** Limits of sequences, limits of sequences defined recursively. Monotonic sequence theorem. Connection with continuity.				
Teaching & Learning Methods:	33 hours of lectures and examples classes, 6 hours tutorials. 111 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:	Numbers and Functions (steps into analysis) – R P Burn (Cambridge 2000). *Library Ref. 515.23 BUR* Yet Another Introduction to Analysis – Victor Bryant (Cambridge 1990). *Library Ref. 515 BRY*				
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%; a 45 minute test in January: 10%				

Updated September 2017