COURSE SPECIFICATION FORM

for new course proposals and course amendments

Department/School:	**Mathematics**	**Academic Session:**	**2017-18**
Course Title:	Combinatorics	**Course Value:** (UG courses = unit value, PG courses = notional learning hours)	0.5 unit
Course Code:	MT4540	**Course JACS Code:** (Please contact Data Management for advice)	G100
Availability: (Please state which teaching terms)	Term 1	**Status:**	Optional Condonable
Pre-requisites:	MT2630	**Co-requisites:**	-
Co-ordinator:	-		
Course Staff:	-		
Aims:	To introduce some standard techniques and concepts of combinatorics, including methods of counting including the principle of inclusion and exclusion; generating functions; probabilistic methods; permutations, Ramsey theory.		
Learning Outcomes:	1. Perform simple calculations with generating functions;. 2. Understand Ramsey numbers and calculate upper and lower bounds for these (where practical); 3. Calculate sets by inclusion and exclusion and understand the applications to number theory; 4. Use simple probabilistic tools for solving combinatorial problems. 5. Demonstrate a breadth of understanding appropriate for an M-level course.		
Course Content:	Enumeration: Binomial identities. The Principle of Inclusion-Exclusion with applications to number theory. Rook polynomials. Generating functions: Linear recursion. Power series and ordinary generating functions. Singularities. Ramsey Theory: Monochromatic subsets, Ramsey numbers and Ramsey's Theorem. Probabilistic methods: First-moment method, Lovász local lemma.		
Teaching & Learning Methods:	The total number of notional learning hours associated with this course are 150. 3 hours of lectures over 11 weeks. Total 33 hours. 117 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:	Discrete Mathematics −N L Biggs (Oxford UP) 510 BIG. Combinatorics: Topics, Techniques, Algorithms – P J Cameron (Cambridge UP) 512.23 CAM. Invitation to Discrete Mathematics = J Matoušek and J Nešetřil (Oxford UP) 512.23 MAT		
Formative Assessment & Feedback:	Formative assignments in the form of 8 problem sheets. The students will receive feedback as written comments on their attempts.		
Summative Assessment:	**Exam:** 100% Written exam. A two hour paper.		

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