COURSE SPECIFICATION FORM

for new course proposals and course amendments

Department/School:	**Mathematics**	**Academic Session:**	**2017-18**
Course Title:	Topolgy	**Course Value:** (UG courses = unit value, PG courses = notional learning hours)	0.5 unit
Course Code:	MT4910	**Course JACS Code:** (Please contact Data Management for advice)	G100
Availability: (Please state which teaching terms)	Term 2	**Status:**	Optional Condonable
Pre-requisites:	-	**Co-requisites:**	-
Co-ordinator:	Professor Brita Nucinkis		
Course Staff:	-		
Aims:	To introduce students to the basic concepts of metric and topological spaces, and to some aspects of low-dimensional topology.		
Learning Outcomes:	1. Understand what it means for knots and links to be equivalent, understand the concept of a knot invariant, and be able to use some invariants to distinguish knots and links. 2. Understand the defining properties of a metric space, and determine whether a given function defines a metric; understand some basic concepts of metric spaces. 3. Understand the definition of a topological space, and be able to verify the axioms in examples. 4. Understand the concepts of subspace, product spaces, quotient spaces, Hausdorff space, homeomorphism, connectedness and compactness. 5. Understand the notions of Euler characteristic, orientability and apply these to classify closed surfaces. 6. Demonstrate a breadth of understanding appropriate for an M-level course		
Course Content:	Knot theory: knot and link diagrams, the Reidemeister moves, 3-colourings of knot diagrams, n-colourings of knot diagrams. Metric spaces: definition of metric spaces; examples of metric spaces, open and closed sets, further topics may include: compactness, Cantor set, continuous maps. Topological spaces: (motivated by properties of open sets in a metric space), examples of topological spaces, subspaces, connectivity, Hausdorff property, continuous functions, homeomorphisms, paths, path-connectedness, product topology, compactness, quotient spaces. Surfaces: identification spaces, connected sums, orientability, triangulations, Euler characteristic, standard examples including the sphere, the cylinder, the torus, the Möbius band, the projective plane, and the Klein bottle; the classification of surfaces. If time permits one or more of the following topics: homotopy, fixed point theorems, further knot theory		
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:	M.A. Armstrong, Basic topology. Undergraduate Texts in Mathematics. Springer-Verlag, 1983. S. E. Goodman, Beginning Topology, American Mathematical Society, 2009. J. A. Munkres, Topology, second edition, Pearson, 1999. W. A. Sutherland, Introduction to metric and topological spaces. Second edition Oxford University Press, 2009.		
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 2 hour paper **Coursework:** None		

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