

COURSE SPECIFICATION FORM
for new course proposals and course amendments

Department/School:	Mathematics	Academic Session:	2017-18
Course Title:	Groups and Group Actions	Course Value: (UG courses = unit value, PG courses = notional learning hours)	0.5 unit
Course Code:	MT3860	Course JACS Code: (Please contact Data Management for advice)	G100
Availability: (Please state which teaching terms)	Term 2	Status:	Optional Condonable
Pre-requisites:	MT1810 and MT1820	Co-requisites:	-
Co-ordinator:	-		
Course Staff:	-		
Learning Outcomes:	<ol style="list-style-type: none"> 1. understand and apply the fundamental concepts of group theory; 2. recognise and construct group homomorphisms and quotients; 3. know basic examples of groups and group actions; 4. count the number of orbits and determine their sizes in specific group actions; 5. apply the concept of a group action to count discrete patterns. 		
Course Content:	<p>Groups: cycle structure and sign of a permutation; symmetric and alternating groups; group axioms; subgroups; order of a group and of group elements; cosets and Lagrange's theorem; homomorphisms, normal subgroups, quotient groups; isomorphism theorems; key examples, such as: cyclic groups, dihedral groups (symmetries of regular polygons) and symmetries of the Platonic solids, matrix groups.</p> <p>Group actions: definition of a group action and connection with permutations; Cayley's theorem; orbits and stabilisers; the size of an orbit and the number of orbits; Burnside's lemma. Applications such as: conjugacy classes and centralisers; counting problems concerning discrete patterns.</p> <p>Further topics as time permits, such as: p-groups, Sylow theorems; simplicity of the alternating groups.</p>		
Teaching & Learning Methods:	<p>The total number of notional learning hours associated with this course are 150 hours. 3 hours of lectures a week over 11 weeks. 33 hours in total. 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.</p>		
Key Bibliography:	<p>Introduction to Algebra - P.J.Cameron (Oxford Univ Press) 512.11 CAM A First Course in Abstract Algebra with Applications -- J.J. Rotman (Pearson Prentice Hall) 512.02 ROT The Theory of Groups: an Introduction -- J.J. Rotman (Springer) 512.51 ROT</p>		
Formative Assessment & Feedback:	<p>Formative assignments in the form of 8 problem sheets. The students will receive feedback as written comments on their attempts.</p>		
Summative Assessment:	<p>Exam: 100% Written exam. A two hour paper. Coursework:</p>		

Updated September 2017

The information contained in this course outline is correct at the time of publication, but may be subject to change as part of the Department's policy of continuous improvement and development. Every effort will be made to notify you of any such changes.