

COURSE SPECIFICATION FORM
for new course proposals and course amendments

Department/School:	Mathematics	Academic Session:	2020-21
Course Title:	Classical Information Theory	Course Value: (UG courses = unit value, PG courses = notional learning hours)	200 h
Course Code:	MT5441	Course JACS Code: (Please contact Data Management for advice)	G100
Availability: (Please state which teaching terms)	Term 1	Status:	Mandatory for MCC Optional for MfA Condonable
Pre-requisites:	Undergraduate courses in probability and algebra.	Co-requisites:	-
Co-ordinator:	-		
Course Staff:	-		
Learning Objectives:	This module will introduce students to the problems of data compression and information transmission in both noiseless and noisy environments.		
Learning Outcomes:	On completion of this module, a student will know a range of techniques for compressing a source and be able to state and apply Shannon's Noiseless Coding Theorem. They will be able to define and use the capacity of a noisy channel and state and apply Shannon's Noisy Coding Theorem. They will have a good working knowledge of entropy. The student should be able to demonstrate a breadth of understanding appropriate for an M-level course and demonstrate independent learning skills.		
Teaching & Learning Methods:	30 hours of lectures. 170 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:	Codes and Cryptography – D Welsh (Oxford UP 1988), Library reference 001.5436 WEL Elements of Information Theory – T M Cover and J A Thomas (Wiley 1991), Library Reference 001.539 COV Information Theory, Inference, and Learning Algorithms – D J C MacKay (Cambridge UP 2003), Library Reference 001.539 MAC		
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: A two hour written exam: 75%. Coursework: Miniproject: 10% Set exercises: 15%		