Course Code and Title	MAS723 - Topics in Probability and Statistics I	
Details of Course	Summary of course The course will cover some basics in high dimensional probability (such as concentration inequalities and random matrices) and their applications to problems from other fields, such as computer science and signal processing.	
	Rationale for introducing this course High dimensional data has become one of the frequently encountered problems in various fields, yet the students do not learn the related mathematical foundation in their regular curriculum. I think it is beneficial to expose the students to some of those topics, familiarise them with basic results and techniques so that they will know how to handle the problems or at least know what kind of references they should look for. Applications will also be covered, which would benefit students from applied/interdisciplinary background.	
	Aims and objectives This course aims to expose students to some probability knowledge not covered in the regular curriculum but could be useful in research related to high dimensional data, computer science or signal processing.	
	Syllabus The course will cover basic concentration inequalities (sum of independent random variables, vectors, matrices), some methods to analyse the upper and lower bound of stochastic processes (Gaussian processes, Slepian, Dudley, generic chaining) and the applications to computer science/signal processing, such as dimension reduction, compressive sensing, random matrices and graph sparsification. Later in the semester, students will be asked to present results from recent research papers in the related areas.	
Assessment	*Homework (individual assessment) – 3 problem sets, each 25%*	75%
	Presentation (individual assessment)	25%
	Total:	100%
Hours of Contact/Academic Units	52 hours / 4 AU	