

CO 642: Graph Theory

This course is the first-year graduate course in Graph Theory. Its aim is to cover several major areas of graph theory, from their classical beginnings to more recent developments, and to emphasise the links with other areas of mathematics.

- (1) Colouring: Brooks' Theorem, Vizing's Theorem and extensions, list colouring, total colouring.
- (2) Flows in graphs: Integer and group-valued flows, the flow polynomial, the δ -flow theorem.
- (3) Ramsey theory: upper and lower bounds, explicit constructions.
- (4) Extremal graph theory: Turán's theorem, $ex(n, H)$, the Erdős-Gallai theorem.
- (5) Probabilistic methods, especially as applied to problems in the above areas.