

Title:	Graph Theory and Ramsey Theory
Lecture hours:	30
Study period: (summer/winter)	winter or summer
Number of credits:	6
Assessment methods:	homework, test
Language of instruction:	English
Prerequisites:	math induction
Course content:	Euler trails and circuits: Euler theorem; Hamilton paths and cycles: Ore theorem; Planarity: Kuratowski's criterion of planarity; Trees and forests: spanning trees, Kirchhoff and Cayley's formulas, Kruskal's algorithm; Connectivity: Menger's theorem; Independence and colouring: matchings and covers, Berge theorem, Hall theorem; Colouring, Brooks' and Vizing's theorems, map colouring; Flows in digraphs: Ford&Fulkerson's theorem; Ramsey's theorem; Exact values and bounds for Ramsey numbers; Ramsey numbers for graphs; arithmetic progressions: van der Waerden's theorem, Erdos-Turan problem.
Learning outcomes:	Students should know basic theorems with proofs, describe applications for various graph theory problems, recognize the Ramsey theory leitmotiv in various contexts, and provide examples of false Ramsey-type results. Should be able to argue as for determining some small Ramsey numbers.
Name of lecturer:	Dr Piotr Sworowski
Contact (email address):	piotrus@ukw.edu.pl
Literature:	Robin J. Wilson, Introduction to Graph Theory, Longman, 1985 Béla Bollobás, Modern Graph Theory, Springer, Berlin, 1998. Reinhard Diestel, Graph Theory, Springer, Berlin, 2000 Ronald L. Graham, Rudiments of Ramsey Theory, American Mathematical Society, Providence, Rhode Island, 1981