MAS575 Combinatorics, 2021 Spring Fall, KAIST

This is a graduate-level course on Combinatorics. Since the area of Combinatorics is so wide, we will study various theorems as well as useful methods for approaching combinatorial problems. The list of topics covered include

- many results in extremal set theory, in particular with linear algebraic methods,

- applications of the combinatorial nullstellensatz,

- existence of a certain object (Ramsey's theorem, Hales-Jewett, Van der Waerden, etc),

- probabilistic methods,

- recent results in combinatorics.

It is strongly recommended that you have certain knowledge of materials covered in Discrete Mathematics (MAS275). Some elementary knowledge of graph theory and probability theory will be helpful.

Lecture	TTh 9:00AM-10:15AM	Classroom: YouTube/Zoom (if online) or TBA (if offline)
Instructor	Sang-il Oum (엄상일)	`https://dimag.ibs.re.kr/home/sangil/`
	Email: sangil@kaist.edu	
	Office: Room B221, Discrete Mathematics Group, Institute for Basic Science. 55 Expo-ro, Yuseong-gu, Daejeon	
Recitation	TBA	
Course website	`http://klms.kaist.ac.kr/`.	
Textbook	No textbook is required. However, the major part of this course will be from the following book (highly recommended):	
	S. Jukna, *Extremal Combinatorics*, Springer-Verlag. ISBN: 978-3-642-17363-9. (E-book available at KAIST Library)	
	Another interesting books:	
	D. West, *Combinatorial Mathematics*, Cambridge.	
	N. Alon, J. Spencer, *The Probabilistic Methods*, Wiley.	
Grading	50% Homework, 50% Report.	
Homework	Homework will be given mostly biweekly on Thursday and it is due at the following Tuesday night. It is allowed to collaborate with other students. But the solution has to be written by yourself independently and you must understand your solution. Students will need to make a PDF file and upload the homework to a website to be announced.	
	The lowest score and the second lowest scores from homework assignments will be dropped.	
Report	Each student will pick a topic on an open problem related to this course and submit a report showing why it is interesting, what is known, and what could be a potential approach.	