

آنالیز ترکیبیاتی
Combinatorial Analysis
19-14-564

مدرس: بهناز عمومی زمان: شنبه‌ها و دوشنبه‌ها، ۱۲-۱۰ صبح مکان: کلاس ۹ ریاضی

آدرس الکترونیکی: <http://ivut.iut.ac.ir> میان ترم: ۱۳۹۷/۸/۱۹ پایان ترم: ۱۳۹۷/۱۰/۲۵

نحوه ارزیابی: میان ترم ۲۵٪ + پایان ترم ۶۰٪ + تمرین‌های تحویلی ۱۵٪ + فعالیت کلاسی + پروژه

About the course:

Combinatorics is a branch of mathematics concerning the study of finite or countable discrete structures. Combinatorics has been developed to a remarkable theory with unanticipated applications and deep connections with fundamental mathematics. This course will cover a wide variety of topics in combinatorics, including counting the structures of a given kind and size (enumerative combinatorics), constructing and analyzing combinatorial objects (such as combinatorial designs, orthogonal Latin squares, orthogonal arrays, finite geometries and SDR), and studying combinatorial structures arising in an algebraic context, or applying algebraic techniques to combinatorial problems (such as Hadamard matrices and permanents).

Outline of the course:

1. Designs: Balanced incomplete block design, t-Design
2. Incidence matrices of BIBD, Fisher inequality
3. Isomorphism and automorphism of designs
4. Residual and derived BIBDS, Bruck-Ryser-Chowla theorem
5. Resolvable BIBDS
6. Steiner triple systems, Bose construction, Skolem construction,
7. Recursive construction of designs
8. Packing and covering
9. Hadamard matrices, Conference matrices
10. Product construction and Williamson's construction of Hadamard matrices
11. Finite projective plane, affine planes
12. Latin squares, orthogonal Latin squares, mutually complete set
13. Orthogonal array and transversal designs
14. System of distinct representation, Philip Hall's theorem
15. Permanents, Vander varden theorem and its application,

References:

1. Combinatorics; Topics, Techniques, Algorithms, Cameron, Peter J. 1996.
2. A course in combinatorics, Vanlint, J.H. and Wilson, R.M., 2003.
3. Combinatorial Designs: Constructions and Analysis, D.R. Stinson, Springer, 2003
3. Design Theory, Lindner, C. C. and Rodger, C. A., 1997.