CO 634 — Design Theory

Combinatorial design theory is the study of highly regular (though not necessarily symmetric) combinatorial structures. The problem of whether such structures exist is often non-trivial. We employ a variety of tools from linear algebra, group theory, number theory, and combinatorics to answer such questions.

Topics: Balanced incomplete block designs, symmetric designs, Hadamard matrices, planes, latin squares and orthogonal arrays, resolvable designs, difference sets, pairwise balanced designs, t-designs, the Witt designs.

References:

- D. Stinson, "Combinatorial Designs: Constructions and Analysis".

Prerequisites: You should have taken at least one undergraduate course in abstract algebra, and be comfortable with basics of group theory, finite fields, and linear algebra (especially concrete matrix algebra).