



**Isfahan University of Technology**  
**Department of Mathematical Sciences**

**Fall 2024**

**Course Title:** Representation and character of finite groups

**Course Level:** Graduate

**Lecture Time:** 08-10 Saturday and Monday

**Lecturer:** Bijan Taeri <http://taeri.iut.ac.ir>

**Office Hours:** 8-11 Wednesday and with appointment.

**Course Outline:**

Group representations, FG-modules, FG-submodules and reducibility, group algebras, FG-homomorphisms, Maschke's Theorem, Schur's Lemma, irreducible modules and the group algebra, more on the group algebra, conjugacy classes, characters, inner products of characters, the number of irreducible characters, character tables and orthogonality relations, normal subgroups and lifted characters, Some elementary character tables, tensor products, restriction to a subgroup, induced modules and characters, algebraic integers, real representations, characters of groups of order  $pq$ , characters of some  $p$ -groups, Character table of the simple group of order 168, character table of  $GL(2, q)$ , permutations and characters, applications to group theory, Burnside's Theorem, an application of representation theory to molecular vibration,

**Textbook:**

James, Gordon Douglas, and Martin W. Liebeck. Representations and characters of groups. Cambridge university press, 2001.

**References:**

1. Isaacs, I. Martin. Character theory of finite groups. Vol. 69. Courier Corporation, 1994.
2. Huppert, Bertram. Character theory of finite groups. Vol. 25. Walter de Gruyter, 2011.
3. Ledermann, Walter. Introduction to group characters. CUP Archive, 1987.

**Mark distribution:**

Midterm 40% (18/Aban/1403)=(08/Decemberr/2024)  
Final Exam 60% (26/Day/1403)=(15/January/2025)