



## Mathematics Math 485 - Group Representation

<b>Instructor</b>	Prof. Ahmad Al Khalaf
<b>Credits:</b>	4 hours
<b>Prerequisite:</b>	Modern Algebra (Math 321)
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<b>Office Hours</b>	See timetable (share folder)

### **Textbook:**

James & Liebeck, Representations and Characters of Groups, , 2nd edition, Cambridge.

### **Overview:**

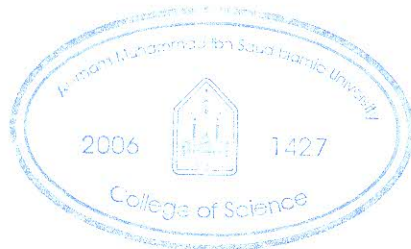
The core subject of this course is an introduction to Representations and Characters of Groups, Permutation Representation. Characters, Character Tables and Orthogonality relations.

### **Exams**

- Midterm1: 6<sup>th</sup> week
- Midterm2: 10<sup>th</sup> week
- Final: 16<sup>th</sup> week

### **Grading:**

- Midterm1: 20
- Midterm2: 20
- Attendance, participation, home works & quizzes: 20
- Final Exam: 40





## Course Contents

Title	Week	Contents	Chapters of the textbook
Chapter1 Group Representations	1	Groups and Homomorphism	1
	2	Linear and Multilinear Algebra	
	3	Group Action –Stabilizer and Orbits – Burnsid's theorem	
	4	Group Representations - Mschke's theorem	
Chapter2 Permutation Representation	5	Permutation Representation and its properties	2
Chapter3 Characters	6	Inner product of characters- Schur's lemma- Orthogonality relations	3
	7	Decomposition of regular representation - Number of irreducible representations	
	8	canonical decomposition and explicit decompositions- Induced representations	
	9	Hermetian representation .	
Chapter4 Character Tables	10	Character Tables and Orthogonality relations	4
	11	Example of Characters Tables. Normal Subgroups and Lifted Characters .	
	12-13	Integrality properties of characters The character of induced representation- Frobenius Reciprocity Theorem.	

