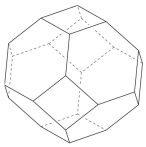
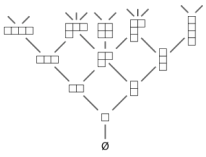
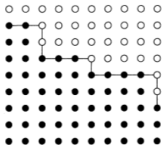


	K_1	K_2	K_3
$\chi^{(1)}$	1	1	1
$\chi^{(2)}$	1	−1	1
$\chi^{(3)}$	2	0	−1





7	4	3	1
5	2	1	
2			
1			

math 850 . representation theory

san francisco state university federico ardila

The topic. A very useful way to study a group is to understand how it acts on vector spaces; in this philosophy, *group elements are verbs, not nouns.* One can then use methods from linear algebra to shed light on the group. This approach is called the *representation theory of groups*, and it is the subject of this course. We will study the general theory, paying special attention to the symmetric group, where algebra, geometry, and combinatorics interact beautifully.

Prerequisites. Math 435/735. Linear algebra will be a key tool; be prepared to review and learn concepts from linear algebra that you may not know, or may have forgotten.

Instructor. Federico Ardila . `federico@sfsu.edu` . Thornton 927

Textbooks.
B. Sagan. *The symmetric group. Representations, combinatorial algorithms, symmetric functions.*
D. Dummit and R. Foote. *Abstract algebra.*

Course website. `http://math.sfsu.edu/federico/reptheory.html`

Meetings. Tue, Thu, 11:00-12:15. Thornton 211.

Office hours.

Agreement. The goal of this course is to offer a meaningful, rigorous, and rewarding experience to every student; you will build that rich experience by devoting your strongest available effort to the class. You will be challenged and supported. Please be prepared to take an active, patient, and generous role in your own learning and that of your classmates.

Homework. During the first half of the course, you will have biweekly assignments ranging from fairly routine exercises to challenging problems. I highly encourage you to think about the problems on your own, and also to discuss them with others. During the second half of the course you will do short weekly exercises, designed for you to ensure your understanding of the material.

Diary. After class n you will discuss the material with a classmate, and turn in a very brief summary of the key points at the beginning of class $n+1$. We will begin class $n+1$ by discussing these. After class $n+1$, you will edit and transcribe your summary of class n into your "diary" (in LaTeX or some other beautiful format). The end result is due on May 19.

Project. In the second half of the course you will write a final project, which will be a chance to go much deeper into a topic of your choice. This could be an expository paper summarizing an aspect of representation theory, the beginning of an original research project, or (why not?) the solution to an open problem in the field. I will suggest possible projects.

Grading and tentative due dates.
- 40% main homework (due Feb. 4, Feb 18, Mar 3, Mar 17)
- 10% short homework (due each Thursday in April and May)
- 20% diary (draft due every meeting, compilation due on May 19)
- 5% extra credit for writing diary entries with $> 2/3$ of the students in the class
- 5% project proposal (due Apr 1)
- 30% final project (due May 24)

Please. No cell phones, newspapers, headphones, inappropriate use of laptops, other disruptive behavior.

Calendar. Here is a short version of the University calendar for Spring, 2016. Note that the Mathematics Department strictly enforces the deadlines for CR/NC grading and withdrawals.

Feb. 9	Last day to add, drop, or request audit grading
Feb 28	Last day to add by exception
Mar. 20	Last day to select CR/NC grading
Mar. 21-26	Spring break
Mar. 21	Cesar Chavez Day
Apr. 26	Last day to withdraw
May 17	Last day to withdraw due to illness or accident
May 17	Last day of class
Jan. 5	Grades available

Academic Integrity and Plagiarism. Academic integrity refers to the "integral" quality of the search for knowledge that a student undertakes. The work a student produces, therefore, ought to be wholly hers or his; it should result completely from the student's own efforts. Plagiarism is a form of cheating or fraud; it occurs when a student misrepresents the work of another as his or her own. Plagiarism may consist of using the ideas, sentences, paragraphs, or the whole text of another without appropriate acknowledgment, but it also includes employing or allowing another person to write or substantially alter work that a student then submits as her or his own. Penalties for cheating and plagiarism range from an F on a particular assignment, through an F for the course, to expulsion from the university.

CR/NC Grading. Most Mathematics classes allow CR/NC grading, but many majors - including Mathematics - do not count CR/NC grades towards the major. Mathematics majors should not take their Mathematics classes CR/NC. All other majors should check with their academic advisors before deciding to take a Mathematics class CR/NC. If - after checking with your advisor - you want to apply for CR/NC grading, you must log onto the website `www.sfsu.edu/student` and sign up for CR/NC grading before the Mar. 20 deadline. Your instructor will not pass out a CR/NC sheet in class.

Incompletes. The Incomplete grade (I) is assigned only to students doing satisfactory work until the last few weeks of a course, when events beyond the students' control prevented them from completing the course. If this happens to you, discuss with your instructor the possibility of taking an Incomplete rather than withdrawing from a class that you cannot finish. Incompletes must be made up within twelve months of the date they are assigned. Your instructor will tell you how to make up your incomplete. Do not enroll in the same course again. You can only take a course once.

Late and Retroactive Withdrawals. Petitions for withdrawal from a class after the November 20 deadline, either before the end of the semester (late withdrawal) or after the semester ends (retroactive withdrawal) must be justified by events that occurred after the withdrawal deadline. In general, only petitions for withdrawal from all courses will be approved. Late withdrawal from your math course alone is usually not approved.

Student disclosures of sexual violence. SF State fosters a campus free of sexual violence including sexual harassment, domestic violence, dating violence, stalking, and/or any form of sex or gender discrimination. If you disclose a personal experience as an SF State student, the course instructor is required to notify the Dean of Students. To disclose any such violence confidentially, contact:
The SAFE Place - (415) 338-2208; http://www.sfsu.edu/∼safe_plc/
Counseling and Psychological Services Center - (415) 338-2208; http://psyservs.sfsu.edu/

Students with Disabilities. Students with disabilities needing reasonable accommodations must bring an official written request to their instructor from the Disability Programs and Resource Center (Student Services Building, Room 110, (415) 338-2472, `drc@sfsu.edu`). The DPRC is available to facilitate the reasonable accommodations process.

Religious Holidays. Reasonable accommodations will be made for you to observe religious holidays when such observances require you to be absent from class activities. It is your responsibility to inform the instructor during the first two weeks of class, in writing, about such holidays.