MORE COURSE INFORMATION

MATH 817, FALL 2009

1. Order of topics

Day	Topic	Reference
Sept 17	reminder on groups	Isaacs, ch 1-3
Sept 22	the Sylow theorems	Isaacs, ch 5
Sept 24	products of groups	Isaacs, ch 7
Sept 29	group actions and permutation groups	Isaacs, ch 4, 6
Oct 1	generators and relations	
Oct 6	the word problem on groups	
Oct 8	solvable groups	Isaacs, ch 8
Oct 13	nilpotent groups	Isaacs, ch 8
Oct 15	categories I	
Oct 20	categories II	
Oct 22	operator groups	Isaacs, ch 10
Oct 27	posets and chain conditions	Isaacs, ch 11
Oct 29	Zorn's Lemma	Isaacs, ch 11
Nov 3	modules	
Nov 5	tensor products	
Nov 10	Artinian and Noetherian rings	Isaacs, ch 12
Nov 12	the Jacobson radical	Isaacs, ch 13
Nov 17	the Artin Wedderburn theorem	Isaacs, ch 14
Nov 18	group algebras and representations	Isaacs, ch 15
Nov 24	characters	Isaacs, ch 15
Nov 26	induced representations	
Dec 1	examples and applications of representations	
Dec 3	combinatorial Hopf algebras	

Sorry to disappoint the people who wanted Galois theory topics, but it does make more sense just to take Math 740 when it comes around again.

Don't take this list too strictly. At the very least we'll probably get behind and won't get to combinatorial Hopf algebras.

We'll use more references for some topics as we go along, but I will always give a freely available reference along with others.

2. Examples of project topics

Here are a few ideas to get everyone started thinking about project topics.

- the classification of finite simple groups
- specific sporadic groups

- calculating A000001
- symmetry groups of interesting objects
- fundamental groups
- covering spaces
- finite presentability for groups
- the isomorphism problem for groups
- supersolvable groups
- transfer (Isaacs, ch 9)
- more useful categorical constructions
- the flavour of category research
- the role of the axiom of choice in modern mathematics
- more theorems on Artinian rings (Isaacs, 14C - 14E)
- Schur functions as characters
- representations in modern number theory, overview or specific results
- representations in particle physics
- interesting open problems relating to ideas from class
- read a research paper, explain the core idea and work out a detailed, insightful example
- interesting examples and applications from your area of research

3. Grading scheme

- Assignments: 40%
- Written project: 30%
- Project presentation: 30%

The written project will be graded on clarity and language, mathematical presentation and insight, and mathematical correctness. There is no specific mark breakdown because there is more than one way to write a good project. I suggest using LaTeX; you'll need to know it sooner or later if you don't already. Something in the 5-8 page range is good, but there is no maximum or minimum. Check with me if you are unsure that what you're doing is appropriate. I strongly suggest handing in your project **one week after your presentation**, but the official deadline is **the last day of class**.

The project presentation will be graded on clarity and interest, communication of core ideas, and mathematical correctness. The presentation should be 10 to 15 minutes with a few minutes of questions following. You may use any medium we can readily provide. Generally, a simple computer presentation or old-fashioned overhead slides are the easiest for beginning presenters, but really good blackboard talks can be sublime. I strongly suggest scheduling your presentation **near related class material**, but the official deadline is **the last day of class**. Note that we can't fit everyone into the last day.

Once some presentations are in the works we will find an auxiliary time for optional practise and feedback.