MATH 4102/5102
POSSIBLE PRESENTATION TOPICS

- Burnside's theorems (See Chapters 6 and 9 of the course text.)
- Representations of the symmetric group (See chapter 10 of course text.)
- Representations and graph theory (See §5.4 of the course text and §§I.5-6 [Ter99].)
- Representations over real vector spaces (See §3.5 [FH91] or §13.2 [Ser77].)
- Representations of compact groups (See chapter 4 [Ser77].)
  - Representations of SU(2) (See §9.10 [Art91].)
  - The Peter-Weyl theorem (See §VII.10 [Sim96].)
- Pontrjagin duality for locally compact abelian groups. (See §4.3 [Fol95].)
- Representations of $\mathrm{SL}(2, \mathbf{C})$. See (Sally's article in [Ash76].)
- Representations of profinite groups
  - Representations of the p-adic numbers or p-adic integers (See index of [DF99].)
  - Representations of Galois groups (See §14.9 [DF99]).
- The fast Fourier transform (See §I.9 [Ter99].)
- Error correcting codes (See §I.11 [Ter99].)
- Representations of $\mathrm{GL}(2, \mathbf{F}_p)$ (See §5.2 [FH91].)
- Applications of group representations in chemistry and physics (See §I.13 [Ter99].)
- Applications of groups representations in probability and statistics (See [Dia88].)

References

[Art91] M. Artin. *Algebra*. Prentice Hall, 1991.

[Ash76] Ash, editor. *Studies in harmonic analysis*. Mathematical Association of America, 1976.

[DF99] Dummit and Foote. *Abstract algebra*. Wiley, 1999.

[Dia88] Diaconis. *Group representations in probability and statistics*. Institute of Mathematical Statistics, 1988.

[FH91] Fulton and Harris. *Representation Theory.* Springer, 1991.

[Fol95] Folland. *A course in abstract harmonic analysis.* CRC, 1995.

[Ser77] Serre. *Linear representations of finite groups.* Springer, 1977.

[Sim96] Simon. *Representations of finite and compact groups.* American Mathematical Society, 1996.

[Ter99] Terras. *Fourier analysis on finite groups and applications.* Cambridge University Press, 1999.