PHY 7500 **Statistical Mechanics** **Fall 2016** **Sean Gavin**

office: Room 320 Physics Research Bldg.
phone: 313-577-0156
email: sean@physics.wayne.edu

TEXT: *Statistical Physics of Particles*, Mehran Kardar
ISBN-13: 978-0521873420 ISBN-10: 0521873428

SUPPLEMENTAL: *Statistical Mechanics*, 2nd ed, Pathria
Fundamentals of Statistical and Thermal Physics, Reif
Statistical Physics, 3rd ed Part 1, (Landau) Lifshitz and Pitaevskii

OFFICE HOURS: after class

EXAMS: There are two in-class exams and one final exam. There will be no makeup exams. Your grade is determined following Plan A or Plan B:

	Plan A	*Plan B*
Homework	40%	40%
Exam	20%	20%
Exam	20%	0% (dropped–lowest exam)
Final Exam	20%	40%

Plan A counts all exams. Plan B drops the lowest in-class exam but weighs the final more heavily. Your grade will be determined according to the plan that gives you the maximum score.

FINAL EXAM: Tuesday, December 20, 2016, 10:40a.m. - 1:10p.m.

COURSE CONTENT:

- Random Walk and Diffusion; Probability
- Kinetic Theory of Gases; Hydrodynamics
- Classical Statistical Mechanics
- Interacting Particles
- Quantum Statistical Mechanics; Ideal quantum gases
- Non-equilibrium Processes; Fluctuations and Noise

LEARNING OUTCOMES: After taking Statistical Mechanics, you will:

- Learn about a wide variety of real systems from molecules to magnets to stars in which statistical physics plays an important role.
- Become familiar with advanced methods in statistical mechanics, including ensemble theory and useful approximation techniques.
- Be able to translate the physical description of real phenomena into equations that can be used to answer relevant questions.
- Apply graduate level mathematical methods needed for such problems.