Instructor:
Yuxuan Wang
Yuxuan.wang@ufl.edu
2116 NPB
Office Hours: T,R | Period 3 (9:35 AM - 10:25 AM)

Teaching Assistants:
Please contact through the Canvas website

Course Description
In this course we will study “statistical physics.” This subject is a link between the microscopic world of one or two particles and the macroscopic world of Avogadro’s number of little particles, all the same. In the micro-world, energy is conserved; the equations are exact, reversible, and can be solved at any level of detail required. In the macro-world the details are lost in some thermodynamic limit; we work with very general relationships among macroscopic properties of systems. Reversibility is often lost and entirely new laws of physics emerge.

Course Pre-Requisites / Co-Requisites
Undergraduate thermodynamics, Mechanics, Quantum Mechanics

Course Objectives
In this course we will lay the foundation to your future coursework and research, including in condensed matter physics, biophysics, astrophysics, and high-energy physics. To achieve this objective you are expected to get somewhat familiar with the material ahead of each class, and to complete the homework on your own. Most importantly, have fun!

Required Textbooks and Software
• R.K. Pathria, Paul D. Beale Statistical Mechanics, 3rd edition

Recommended Materials
• Landau and Lifshitz, Statistical Physics
• K. Huang, Statistical Mechanics
• David Tong’s online lecture notes

Course Schedule
Weekly HW’s are due on Mondays. Midterm: Friday, Feburary 28. Final: Tuesday, April 28.

Topics covered includes (tentative):
Thermodynamics
Kinetic Theory
Microcanonical Ensemble
Canonical Ensemble
Grand Canonical Ensemble
Quantum Statistical Mechanics
Partition Function
Fermi Gas
Bose Gas
Imperfect Gas
Cluster Expansion
Phase Transitions
Ising Model: Onsager Solution

**Evaluation of Grades**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage of Final Grade</th>
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<tbody>
<tr>
<td>Homework Sets (10)</td>
<td>40%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>35%</td>
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<td>100%</td>
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**Grading Policy**
The following is given as an example only.

<table>
<thead>
<tr>
<th>Percent</th>
<th>Grade</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.0 - 100.0</td>
<td>A</td>
<td>4.00</td>
</tr>
<tr>
<td>87.0 - 89.9</td>
<td>A-</td>
<td>3.67</td>
</tr>
<tr>
<td>84.0 - 86.9</td>
<td>B+</td>
<td>3.33</td>
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<tr>
<td>81.0 - 83.9</td>
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<tr>
<td>78.0 - 80.9</td>
<td>B-</td>
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<tr>
<td>75.0 - 79.9</td>
<td>C+</td>
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<tr>
<td>72.0 – 74.9</td>
<td>C</td>
<td>2.00</td>
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<tr>
<td>69.0 - 71.9</td>
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<tr>
<td>66.0 - 68.9</td>
<td>D+</td>
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<td>D</td>
<td>1.00</td>
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<tr>
<td>60.0 - 62.9</td>
<td>D-</td>
<td>0.67</td>
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<tr>
<td>0 - 59.9</td>
<td>E</td>
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More information on UF grading policy may be found at:
http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

**Students Requiring Accommodations**
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

**Course Evaluation**
Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://gatorevals.aa.ufl.edu/. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://gatorevals.aa.ufl.edu/.

**University Honesty Policy**
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.

Statistical Mechanics, PHY6536
Yuxuan Wang, 2020 Spring
On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (https://www.dso.ufl.edu/scrc/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

**Software Use**
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

**Student Privacy**
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html

**Campus Resources:**

**Health and Wellness**
- **U Matter, We Care:** If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.
- **Counseling and Wellness Center:** [http://www.counseling.ufl.edu/cwc](http://www.counseling.ufl.edu/cwc), and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
- **Sexual Assault Recovery Services (SARS)**
  Student Health Care Center, 392-1161.
- **University Police Department** at 392-1111 (or 9-1-1 for emergencies), or [http://www.police.ufl.edu/](http://www.police.ufl.edu/).

**Academic Resources**
- **E-learning technical support**, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. [https://lss.at.ufl.edu/help.shtml](https://lss.at.ufl.edu/help.shtml).
- **Library Support**, [http://cms.uflib.ufl.edu/ask](http://cms.uflib.ufl.edu/ask). Various ways to receive assistance with respect to using the libraries or finding resources.
- **Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. [https://teachingcenter.ufl.edu/](https://teachingcenter.ufl.edu/).
- **Writing Studio, 302 Tigert Hall**, 846-1138. Help brainstorming, formatting, and writing papers. [https://writing.ufl.edu/writing-studio/](https://writing.ufl.edu/writing-studio/).