# PHY 4523 Statistical Physics
## (Spring 2014: Section 3803, 3 credits)

Tentative Syllabus (Version of 07 January 2014, typos corrected)
http://www.phys.ufl.edu/~meisel/PHY4523-Spring-2014.html

**Instructor:**
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**BEST Place to Find Me:** NPB B133, Tel: 392-9147, Email: meisel@phys.ufl.edu
Office Hours: posted online, http://www.phys.ufl.edu/~meisel/schedule.htm, and by appointment.

**Email Correspondence with Instructor:**
Professor Meisel will attempt to respond, within 24 hours, to email (**from UF email accounts**) if the message contains the name of the student. **Email will only be sent to UF Email addresses.**

**Prerequisites:**
PHY 3513 and PHY 4604; along with differential equations.

**Meeting Times and Place:**
Mondays, Wednesdays, and Fridays: 8th period (3:00 pm – 3:50 pm) in NPB 1002. Students are expected to attend the lecture sessions.

**Textbook:**
The "official" textbook, which is required, is "Introductory Statistical Mechanics (2nd Edition)" (Clarendon Press, Oxford, 1999) by R. Bowley and M. Sanchez, and is available from Oxford University Press for about $80 but used paperback versions appear to be available for about $30 from Amazon (as of 12 Dec 2013). Of course, other options might be available.

**Posting:**
Materials and information concerning the course, including important dates and an *"in vivo"* schedule will be posted on the Course Webpage, see http://www.phys.ufl.edu/~meisel/PHY4523-Spring-2014.html.

**Subject and Focus of the Course:**

This course is a basic course covering "statistical physics", which is generally taken to mean the microscopic approach of the subject. Consequently, it is an extension of "macroscopic" thermodynamics. Since the microscopic approach will be taken, then the quantum mechanical nature of the particles will be an issue. The course will begin with a quick review of "macroscopic" thermal physics, and then kinetic theory and statistical mechanics will be discussed providing and introduction for more advanced work on Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics.

Students entering this course have a wide variety of backgrounds. Although quite a bit of material may seem redundant, do not be fooled or lulled into a false sense of intellectual security. The course will attempt to be self-contained and will lay the foundations of the mathematics necessary for understanding the material. If you find this material boring, please understand that its coverage is necessary for those students whose background may not be as comprehensive as your own. If at any time you are truly bored, please talk to the Instructor. He can make suitable arrangements/adjustments or assign more sophisticated problems or projects for your private consideration.

The course is constructed and aimed for constant class participation. The instructor will assume that you are reading the book and working the examples and relevant problems. You are expected to maintain the pace of the course, and the quizzes and examinations are designed to help guide you in this process. Cramming before an examination will not work! Like a world-class musician or athlete, you must train EVERYDAY. Of course, you do not want to burn-out, but you must daily train to think like a physicist.

Attendance in class is definitely expected since material outside the textbook may be presented. YOU ARE RESPONSIBLE FOR ALL MATERIAL COVERED IN THE TEXT AND IN CLASS. ALL THIS MATERIAL IS RELEVANT FOR QUIZZES AND EXAMINATIONS, unless otherwise stated.

The ultimate goal of the course is for the students to learn more details about thermodynamics and statistical mechanics and to be able to use the machinery of mathematics to solve general problems associated with the subject. Highly specialized problems are the subject of advanced courses in physics, chemistry, engineering, biology, economics, and other disciplines. To realize this goal, students will not be allowed to use textbooks or notes for the quizzes or the examinations. Any specialized details, formulas or physical constant values will be provided as needed.

A final word about successful completion of the course: there is no secret. If you attend class (and participate), read the textbook, and work the problems and examples, then you will learn the material. When in doubt, WORK MORE PROBLEMS! If you exhaust all problems from the textbook, see the instructor who will be happy to supply more. Remember: this stuff should be fun! If in itself it is not fun and challenging, then it should be some hoop that you are jumping so you may proceed with some fun stuff. So, you should always stay motivated to learn the material.

If at any time there is a question in your mind about anything, please do not hesitate to talk to the instructor. See him immediately before or after class, if necessary, to set specific appointments.

**Attendance:**
Attendance in class is definitely expected since material outside the textbook will be presented. You are responsible for all material covered in the text and in class. All of this material is relevant for any graded exercise, unless otherwise stated.

**General Education:**
This course does not possess any designation for satisfying the General Education Requirement at the University of Florida. The significance of this non-designation and the associated details, including the Student Learning Outcomes (SLOs) and their connection to the Academic Learning Compacts (ALCs), are discussed at the official UF General Education Webpage, see http://gened.aa.ufl.edu.

**Grading:**
Graded material will consist of 9 quizzes of 5 points each (with the best 8 scores counting toward the final course grade), 2 homework assignments of 10 points each (with both scores counting toward the final course grade), 3 Mid-Term Exams (MTE) of 30 points each (with all three scores counting toward the final course grade), 60 points collected with the HITT device (where a maximum of 50 points will count toward the final course grade), one Final Exam, which is comprehensive, of 100 points, and potentially some extra credit assignments (these opportunities will be described during the course). The letter grade assignment based on percentage of points earned is given in the next paragraph and any potential adjustment of this scale will be discussed in class. Finally, the UF grading policies can be found at found at: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

**Summary of Points Available**

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|---|---|---|
| Quizzes (8 of 9) | 40 points | 13.3% |
| Homework (2 of 2) | 20 points | 6.7% |
| Mid-term Exams (3 of 3) | 90 points | 30.0% |
| HITT Points (50 of 60) | 50 points | 16.7% |
| Final Exam (1 of 1) | 100 points | 33.3% |
| | --- | --- |
| Total | 300 points | 100.0% |

**Final Course Grade Scale**

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|---|---|
| A | 85% - 100% |
| A- | 80% - 84.999999% |
| B+ | 75% - 79.999999% |
| B | 70% - 74.999999% |
| B- | 65% - 69.999999% |
| C+ | 60% - 64.999999% |
| C | 55% - 59.999999% |
| C- | 50% - 54.999999% |
| D+ | 45% - 49.999999% |
| D | 40% - 44.999999% |
| D- | 35% - 39.999999% |
| E | 0% - 34.999999% |

**Make-Up of Graded Material:**
Only in the event of extraordinary circumstances will students be allowed to take a make-up graded material. The only way students will be allowed to take a make-up exercise is if they have a legitimate excuse, accompanied by some documentation from a medical doctor, an attorney, or a UF official. Notes from family members are not acceptable. When possible, the student should inform the Instructor in advance of absences from graded assignments.

**Academic Honesty:**
Each student is expected to generate graded work by an individual and original effort. It is understood that some students benefit from "group study". However, all quizzes, tests, and the final examination will be individual efforts, using only the materials authorized by the Instructor. Any violation of this policy will be treated according to UF policy (e.g. usually a zero grade is given on the assignment). Please review the University Policies on Academic Honesty, and helpful links are: http://www.dso.ufl.edu/sccr/ and http://www.dso.ufl.edu/studenthandbook/studentrights.php. Note that the process is one that involves the faculty member and the students:

> ***"In adopting this Honor Code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the University community. Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the Honor Code. Any individual who becomes aware of a violation of the Honor Code is bound by honor to take corrective action. A student-run Honor Court and faculty support are crucial to the success of the Honor Code. The quality of a University of Florida education is dependent upon the community acceptance and enforcement of the Honor Code."***

**Accommodations and Advising:**
Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. The Dean of Students Office maintains a webpage at http://www.dso.ufl.edu/.

**Advising and Counseling:**
The Department takes part in "UFTeach", a program designed to develop the next generation of Florida's math and science teachers. For more details see http://ufteach.clas.ufl.edu. Due to the nature of the environment at the university, it is not uncommon for students to experience stressful situations, and "study harder" sometimes does not seem to work. If you find yourself in this situation, you are encouraged to seek confidential counseling, see: http://www.counseling.ufl.edu/cwc/.

**Incomplete Policy:**
A grade of incomplete is typically given to students who endure a situation in which they are incapable of completing the coursework. The I-grade is not to be given to students who are simply dissatisfied with their performance in the course. If you find you are in a situation that might qualify you for an I-grade in this course and you want to pursue this potential option, then you must contact me immediately and be sure to have the necessary documentation from a medical doctor or an attorney. Again, letters from family members are not acceptable. A letter of understanding indicating when and how the incomplete grade will be made up will eventually be drafted and signed by the student and the Instructor. A PDF of the policy is posted at: http://www.phys.ufl.edu/downloads/gradepolicy.pdf.

**Final Exam and Special Notes about the Syllabus:**
Please note that the dates for all graded materials, except the Final Exam, are TENTATIVE. The schedule will be finalized during the course and will be announced in class and posted to the *"in vivo"* schedule, see http://www.phys.ufl.edu/~meisel/PHY4523-Spring-2014.html. The Final Exam in NOT tentative and is: **Final Exam (Group 30D): Wednesday, 30 April, 3:00 pm to 5:00 pm, NPB 1002. The Final Exam covers material from the entire course.**

**HITT Points:**
During the class periods, the HITT System (Remote Response System) will be used to monitor the understanding of the topics being discussed. The HITT System may be used at any time during the class period. In some instances, the responses will not be graded as correct or incorrect, so the point is awarded for participation. For the other cases, the exercise will be graded in either a "2-1" (2 points for the correct response and 1 point for an incorrect response) or "5-2" (5 points for the correct response and 2 points for an incorrect response) formats. In most instances, the HITT exercises will be open book and "chat with a neighbor"; however, electronic devices linked to the web and calculators will NOT be permitted. The specific rules covering each exercise will be explained when the problem is presented.

**HITT Remote Responder Required:**
You need to have your own HITT remote transponder. Before purchasing a new one or borrowing an old one from a friend, please review the hardware requirements at: http://www.phys.ufl.edu/~hitt/.

**HITT Registration Required:**
**You must correctly register your unit before Wednesday, 22 January.** The registration web-based site is at: http://www.phys.ufl.edu/~hitt/. **YOU MUST USE YOUR UF EMAIL ADDRESS!**

**HITT Comments:**
**You are responsible for having an operational and appropriately registered device. Testing will occur during classes prior to Wednesday, 22 January. On Wednesday, 22 January, the recording of the points will begin.**

**Comments on Materials Allowed for Quizzes, Tests, and Examinations:**
Calculators are permitted for this course, but they may not be an integral part of a device that links to the internet or any remote Wi-Fi system. A formula sheet will be provided as needed and will be the same for each student. For tests and the final exam, this sheet will be distributed.

**Comments on Knowing Your Grades:**
It is expected that graded material will be returned to each student at the start of the first class period after which it was generated. Students should NOT mark on the graded sheets. The material and rubric will be reviewed in lecture. After the review, if a student has any question about the grading of the work, it should be returned to the Instructor. In a timely manner, the student should meet with the professor to review the grading. If a student decides that the work is correctly graded, then the student may keep the graded work. At that point, the student yields any opportunity to debate how the work was graded. The student should keep the hardcopy until the end of the semester in case there is any dispute about the total number of points earned during the course. The E-Learning system is used to electronically post the grades, https://lss.at.ufl.edu/. If you have any questions about your points on any material or for the course, please contact the Instructor.

**General Classroom Behavior:**
The reading of newspapers, the working of puzzles, and the use of electronic devices such as cell phones, laptops, and tablets are not permitted unless approved for use to make classroom accommodations. Please mute your personal electronic device, and if you need to attend to an emergency, please quietly exit the classroom to handle the text message or phone call in the atrium.