



School of Engineering Physics, Faculty of Engineering

Subject Code: PHYS385

Subject name: STATISTICAL MECHANICS

Pre -requisites: PHYS235

Credit points: 6

Offered: Spring Session 2012, Wollongong Campus

CONTACTS

Subject Coordinator and Lecturer

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Students will be contacted throughout the Session via UoW SOLS Mail with important information relating to this subject.

N.B. UoW email and UoW SOLS mail are not the same. Messages sent to SOLS mail do not go to your email account and vice-versa.

Subject outcomes and brief outline

Learning Outcomes

After successfully completing the subject, the student will

- (i) have a fundamental knowledge of the behaviour of matter on a microscopic scale which will enable them to predict its macroscopic behaviour such as its thermodynamical properties.
- (ii) be able determine the distribution of electrons amongst the energy states of metals, insulators and semiconductors.

Outline

It covers basic theory of statistical mechanics including: states of a system; ensembles; systems in contact; energy exchange and temperature; entropy; chemical potential; Gibbs and Boltzmann factors; partition functions; fluctuations; identical particles; classical and quantum gases; blackbody radiation and photon distribution; Debye theory of solids and phonons; transport phenomena and kinetic theory; semiconductor statistics; introduction to superconductivity, superfluidity and phase transition.

Lecture times

Lecture 1	Mon	11:30	12:30	24.203
Lecture 2	Wed	9:30	10:30	24.104
Lecture 3	Wed	16:30	17:30	6.210

Practical See laboratory handout detail from 6-314/6-316,
Mon 13:30 16:30 or Wed 13:30 16:30 41-262 or Thu 13:30 16:30, Room 6-314/6-316. All Weeks
Practical work will commence in Week 1.

Lecture schedule

	lectures	Lecturer	Assignments
Week 1	Chapter 1	Zhang	
Week 2	Chapter 2	Zhang	2.3, 2.5
Week 3	Chapter 3	Zhang	3.3, 3.6
Week 4	Chapter 5	Zhang	5.6, 5.12
Week 5	Chapter 4	Martin	4.6, 4.13, 4.17
Week 6	Chapter 4,6	Martin	
Week 7	Chapter 6,7	Martin	6.5, 6.9, 6.13
Week 8	Chapter 7,13	Martin	7, 12, 7.13
Week 9	Chapter 13	Martin	13.2, 13.5
Week 10	Chapter 10	Zhang	10.1, 10.4, 10.7
Week 11	Chapter 14	Zhang	14.3, 14.5
Week 12			
Week 13			

Attendance requirements

The University Code of Practice Students states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the subject outline.

Graduate Qualities

This subject contribute to student development of UoW Graduate Qualities. Also see

<http://cedirsd.uow.edu.au/eng/index.aspx>

- Problem solving skills

Text book

Thermal Physics, 2nd edition by C. Kittel and H. Kroemer, Freeman, San Francisco, 1980 (2 copies in library)

References

There are many good books in the library. A good book containing more technical details is “Fundamentals of statistical and thermal physics”, F. Reif, McGraw-Hill, New York, 1980.

Additional Materials

No additional material needs to be purchased

ASSESSMENT

Your final subject mark will be calculated from the following:

Final Examination: 50%

Practical work 30%

Assignments: 20%

NOTE: Satisfactory performance (40% minimum in the final exam and 50% minimum in practical work) is required for an overall pass. Failure to perform satisfactorily in the final exam or in the practical will result in a FAIL (TF) being recorded as your grade. Marks are not normally scaled or modified in this subject.

Laboratory work: in the laboratory class, (see separate handout)

Late Work

Late work will not be marked.

Academic consideration

Academic consideration may be granted if a good reason is demonstrated. The school is under no obligation to make allowance for poor performance related to illness or other circumstances beyond the student's control and no such allowance will normally be considered without documented evidence and a request submitted via SOLS as soon as possible after the event. A doctor's certificate does not remove the obligation

to undertake the assessment. In the event of a missed test and the school decides to offer a supplementary test, then the test may be held after the end of session examination period. The school reserves the right to determine the student's grade on performance in other aspects of the subject. Any supplementary exam will be structured so that no unfair advantage is gained from the extra study time available.

University and Faculty Policies

Students should make themselves aware of the University and Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters. Further information can be found in the Faculty Policy document (available in hard copy from the Engineering Enquiry Centre (EEC) or on line at

<http://www.uow.edu.au/eng/about/policy/index.html>

Plagiarism

Plagiarism will not be tolerated and has led to exclusion. Further information on plagiarism can be found in the Faculty Policy document, with full details available at:

<http://www.uow.edu.au/about/policy/UOW058648.html>

Exams

- Foreign language translation dictionaries are not permitted in exams.
- Calculators approved for use in exams must be identified by a UOW tamper-evident label.

Supplementary Assessment

Students who receive a mark of 48 or 49% will be considered for supplementary assessment. The offer of supplementary assessment is not automatic and will be considered on a case by case basis. The precise form of supplementary assessment will be determined at the time the offer of a supplementary assessment is made. Students must make themselves available during the supplementary examination period to take up any offer of supplementary assessment. Note that the grade of PC no longer exists.

Chao Zhang

A D Martin

July, 2012