

# Physics 7050: Elementary Solid State Physics

## Spring 2013

**Lecturer:** Boris Nadgorny

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**Lectures:** MWF 10:40=11:35, Room 117 Physics

**Office hours:** Wed: 1:30 –2:45

### REFERENCES:

#### Main Texts:

1. *J. R. Hook and H.E. Hall, Solid State Physics, Second edition*

June 30, 1995 | ISBN-10: 0471928054 | ISBN-13: 978-0471928058 |

#### Additional References:

2. *Grosso and Paravicini, Solid State Physics*

3. *Kittel, Introduction to Solid State Physics*

4. *Ashcroft and Mermin, Solid State Physics*

#### Course Outline:

1. Introduction: What is Solid State Physics	Lecture Notes
2. Crystal structures and symmetries, Bonding	Ch.1.1 -1.3, Ch. 1.6, 4.3,1-2
3. X-ray diffraction and reciprocal lattice	Ch. 1.4, 11.1-2
4. Crystal dynamics	Ch. 2.1-5
5. Electrons in metals	Ch. 3, 13.1-5
6. Band theory	Ch.4, 11.3-4
7. Semiconductors	Ch. 5
8. Semiconductor devices	Ch. 6

9. Para- and dia- magnetism	Ch.7
10. Ferromagnetism	Ch. 8
11. Dielectrics and ferroelectrics	Ch. 9
12. Superconductors	Ch.10, Lecture notes
13. Optical properties	Ch.13.6
14. 2D systems and surfaces	Ch. 14
15. Special Topics	Lecture notes

**Homework:**

Homework will be assigned weekly on the first class of the week and are due in a week. It is acceptable (and can be very useful) to discuss homework problems with each other and compare different solutions. However, copied homework will not be credited. Late homework will not be accepted.

**Quizzes:**

Short quizzes similar to homework problems will be given once 1-2 weeks

**Exams:**

There will be no make-up in class exams. However, you can substitute any missed in-class exam by 50% of your score for the final exam.

**Grade:**

First Exam – 20%

Midterm – 20%

Final Exam – 40%

Quizzes – 10%

Homework – 10%

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Total –100%