

# Physics 7050: Elementary Solid State Physics

## Winter 2018

**Lecturer:** Boris Nadgorny

**Office:** PRB 389

**Phone:** 577-2757

**E-mail:** nadgorny@physics.wayne.edu

**Lectures:** MWF 10:30-11:20, Room 117 Physics

**Office hours:** Friday: 2:30 – 4:15 pm.

### 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:**

There will be about 6-7 homework assignments during the semester. To receive full credit, the solutions should be clearly written and explain all the important steps. It is acceptable (and can be useful) to discuss homework problems with each other. However, you are not allowed to copy the work of others or use problem solutions obtained from any other source. If two identical papers are submitted, each student, after receiving a warning, will only be credited 50% of the total score; no score will be given the second time. Late homework will be accepted (until the solutions are posted), but the score will be reduced by 25 %.

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**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%

Homework – 20%

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Total –100%