UMCS
Condensed Matter Physics
Summer 2019/2020

Instructor Information:
Instructor: Dr Nicholas Sedlmayr
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Course Web Page: See this page.

Recommended books:

- Introduction to Solid State Physics - Kittel
- Solid State Physics - Ashcroft and Mermin

Further reading:

- Introduction to Solid State Theory - Madelung
- Quantum Theory of Solids - Peierls
- Modern Condensed Matter Physics - Girvin and Yang

Course Content: The (potential) topics of this course include:

- Crystal structure
  - Lattices
  - Bragg's law
  - Bonding
- Crystal dynamics - sound and phonons - heat capacity
- Free electron gas
- Electrical and thermal conductivity - Wiedermann-Franz law
- Nearly-free electron theory
- Classification of metals, insulators and semiconductors
- Tight-binding approach
- Band structure and effective mass
- Semiconductors

- Metals
- Magnetic order

Grading: The course grade will be based on participation in the classes and a final exam.

Objectives: To have an overview of the foundations of solid state physics, and an understanding of the properties of electrons in periodic crystal lattices.

Prerequisites: Quantum Mechanics, Calculus.