

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](#)

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

- Crystal structure
 - Lattices
 - Bragg's law
- Crystal dynamics - sound and phonons - heat capacity
- Free electron gas
- Electrical and thermal conductivity - Wiedemann-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.