General University Lecture - UMCS
Topology in Physics
Winter 2020/2021

Instructor Information:
Instructor: Dr Nicholas Sedlmayr
Office: Institute of Physics, 306
Email: sedlmayr@umcs.pl

Course Web Page: See this page.

Course Content: The topics of this course will include:

- What is topology?
- Phases of Matter: Topology and Symmetry
- The role of mathematical ideas in physics: limits, change, symmetry, fields, and . . . topology
- Topology and fundamental physics
- Types of topology in materials: Long range entanglement and symmetry protected topology
- Topological Insulators and Superconductors
- Bulk-boundary correspondence
- Topology of what exactly?

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

Objectives: The idea of this course is to give a general understanding of what topology is and how it has helped shape our modern understanding of physics. what can the idea of topology, which has to do with what properties remain when we deform shapes, possibly tell us about physics? This is what we will find out. We will then compare this to how various other deep mathematical ideas have profoundly altered physics.

Prerequisites: Curiosity. No particular mathematics or physics knowledge is needed.