Physics 5555– Solid State Physics, Part I
Syllabus – Fall 2003

Instructor: Massimiliano Di Ventra
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Office hours: by appointment

Recommended Texts: No single book will be followed. Different sources will be used for different subjects. The following sources are the most used:

- Ashcroft and Mermin, "Solid State Physics"
- Ziman, "Principles of the Theory of Solids"
- Ziman, "Electrons and Phonons"
- Callaway, "Quantum Theory of the Solid State"
- Harrison, "Solid State Theory"
- Kittel, "Quantum Theory of Solids"
- Kittel and Kroemer, "Thermal Physics"
- Madelung, "Introduction to Solid-State Theory"
- Bassani and Pastori Parravicini, "Electronic States and Optical Transitions in Solids"
- Bransden and Joachain, "Physics of Atoms and Molecules"
- Schrieffer, "Theory of Superconductivity"
- Mahan, "Many-Particle Physics"

Prerequisites: Quantum Mechanics.

Lectures: Monday, Wednesday 5:30 PM - 6:45 PM, Robeson Hall 112.

Grading: On average, one exercise per week will be assigned that will count 70% of the final grade. At the end of the semester the students will have to pass an exam that will count 30% of the final grade.

List of Topics: Crystal Structures,
electrons in crystals,
energy bands,
Hartree, Hartree-Fock and Density-Functional approaches

lattice vibrations and phonons,
electron-phonon interactions,
polarons,
dielectric properties of solids.