

# Introduction to Nano Physics

course number 203-1-3321

second semester 2012

## **Syllabus:**

1. Introduction;
2. The physics of semiconductors;
3. Conduction in nano structures: Landauer formula, quantum point-contacts, conductance quantization;
4. Quantum interference effects in transport properties;
5. Thermoelectric transport in nano structures;
6. Weak localization and Anderson metal-insulator transition;
7. The quantum Hall effect;
8. Spin-orbit interaction and spin effects;

## **Bibliography:**

1. Y. Imry, *Introduction to Mesoscopic Physics*, Oxford University Press, 1997.
2. S. Datta, *Electronic Transport in Mesoscopic Systems*, Cambridge University Press, 1997.
3. T. Ihn, *Electronic Quantum Transport in Mesoscopic Semiconductor Structures*, Springer Tracts in Modern Physics, Vol. 192, 2003.
4. D. K. Ferry, S. M. Goodnick, and J. Bird, *Transport in Nanostructures*, Cambridge University Press, 2009.