

Informations

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Class schedule

13 lectures & 13 tutorials (52 h in total): <https://ernest.unistra.fr>

Syllabus

I – Semiconductors

Intrinsic and doped semiconductors. Band bending. Charge carriers. Electronic transport and mobility. p - n junctions.

II – Magnetism

Diamagnetism and paramagnetism. Exchange interaction. Ferromagnetism et antiferromagnetism.

III – Superconductivity

Meissner effect. Critical temperature. Energy gap. Ginzburg–Landau equation. Coherence length and penetration depth. Type I and type II superconductors.

Literature

- N.W. Ashcroft, N.D. Mermin, *Solid State Physics* (Saunders College, 1976)
- S. Blundell, *Magnetism in Condensed Matter* (Oxford University Press, 2001)
- J.M.D. Coey, *Magnetism and Magnetic Materials* (Cambridge University Press, 2010)
- P.G. de Gennes, *Superconductivity of Metals and Alloys* (Westview Press, 1999)
- S.M. Girvin, K. Yang, *Modern Condensed Matter Physics* (Cambridge University Press, 2019)
- G. Grosso, G. Pastori Parravicini, *Solid State Physics* (Academic Press, 2014)
- C. Kittel, *Introduction to Solid State Physics* (John Wiley & Sons, 1996)
- C.F. Klingshirn, *Semiconductor Optics* (Springer, 2012)
- M.P. Marder, *Condensed Matter Physics* (John Wiley & Sons, 2000)
- Y.U. Peter, M. Cardona, *Fundamentals of Semiconductors: Physics and Materials Properties* (Springer, 2010)
- S.H. Simon, *The Oxford Solid State Basics* (Oxford University Press, 2013)
- M. Tinkham, *Introduction to Superconductivity* (Dover, 1996)