The Hong Kong University of Science and Technology

UG Course Syllabus

Semiconductor Physics for Solid-State Electronics

ELEC4510

3 credits

Prerequisite: ELEC 3500

Instructor: Man Hoi WONG

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Course Description

This course covers fundamental semiconductor physics relevant to modern electronics and provides a physical understanding of advanced solid-state devices. Topics include quantum mechanics of electrons in solids, crystalline structures, band theory of semiconductors, electron statistics and dynamics in energy bands, carrier transport, and semiconductor heterostructures. Background in basic calculus, linear algebra, and probability is assumed.

Assessments:

Assessment Task	Contribution to Overall Course Grade (%)
Homework assignments	15%
Midterm 1	25%
Midterm 2	25%
Final examination	35%

Required Texts and Materials

Debdeep Jena, *Quantum Physics of Semiconductor Materials and Devices*, Oxford University Press.

Additional Resources

1. E. F. Schubert, *Doping in III-V Semiconductors* (1st Edition), Cambridge University Press.
2. David J. Griffiths and Darrell F. Schroeter, *Introduction to Quantum Mechanics* (3rd Edition), Cambridge University Press.
3. Herbert Kroemer, *Quantum Mechanics for Engineering: Materials Science and Applied Physics* (1st Edition), Pearson.
4. Charles Kittel, *Introduction to Solid State Physics* (8th Edition), John Wiley & Sons.
5. Neil W. Ashcroft and N. David Mermin, *Solid State Physics* (1st Edition), Cengage Learning.