The Hong Kong University of Science and Technology

UG Course Syllabus

Semiconductor Physics for Solid-State Electronics

ELEC4010Q

3 credits

Prerequisite: ELEC 3500

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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.

Assessments:

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

Required Texts and Materials

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

Additional Resources

The following reference texts are on reserve in the university library:

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.