

Notes for ECE 30500 - Semiconductor Devices

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These are lecture notes for Fall 2025 ECE 30500 by professor Haitong Li at Purdue. Modify, use, and distribute as you please.

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Introduction

The core of semiconductors lies in the silicon transistor. But, why silicon (**Si**)?

- Si is the second most common element on Earth.
- It is easily purified, and grown defect free.
- Reasonably good electronic properties
- Resilient to harsh environments
- Excellent mechanical properties

SiO₂ is a remarkable material because:

- It interfaces very well with Si
- Excellent insulator
- Excellent barrier against impurity diffusion
- High etch selectivity to Si