



EEE-1222: Basic Electronics

Computer Science & Engineering (CSE)

Lecture PPT # 01

<http://study.riazulislam.com>



University of
Dhaka

APECE
DU

Course Teacher: Dr. S.M. Riazul Islam

Date: 2012 Year, 07 Month, 03 Day



Contents

- Course Introduction
- Contents to be covered
- Atom, Electron Orbit, and Energy Levels
- Energy Bands
- Conduction in Solids
- Conventional current and electron flow
- Bonding forces between atoms
- Conductors, Insulators, and Semiconductors

Course Introduction

- Course Title: Basic Electronics
- Course Code: EEE-1222
- Credits: 3
- Evaluation**
 - Attendance: 4
 - In-course exam: 20
 - Final Exam: 56
- Schedule**
 - 25-30 Lectures: Diodes, Transistors, and Single Stage Amplifiers
 - In-course after 15/20 Lectures if not assigned by exam committee
 - 15-20 Lectures: FET, PNP, OP-amps, etc

Course Introduction

❑ Reference Books:

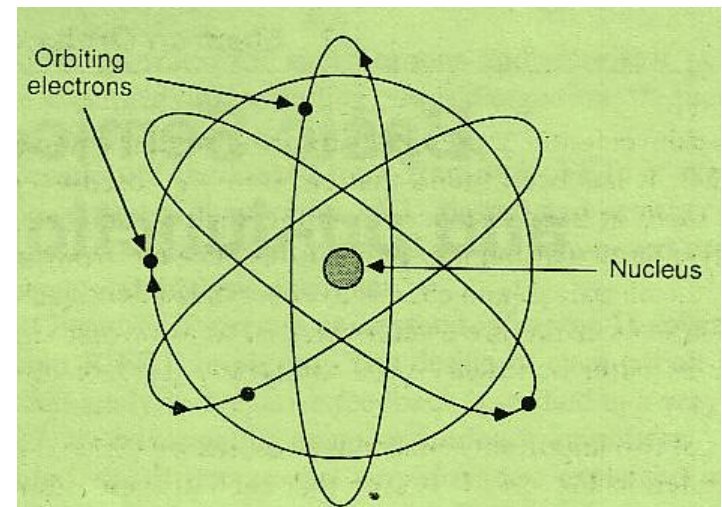
- ❑ Electronic Devices and Circuits- David A. Bell
- ❑ Electronic Devices and Circuit Theory- Robert L. Boylestad
- ❑ Principles of Electronics- V.K. Mehta, Rohit Mehta

Syllabus

- Theory of P-N Junction, Diodes, and Transistors
- BJT characteristics, biasing and Small Signal amplifiers using BJT
- FET characteristics, biasing and amplifiers using FET
- PNPN devices: UJT, SCR, DIAC, TRIAC
- Op-amps

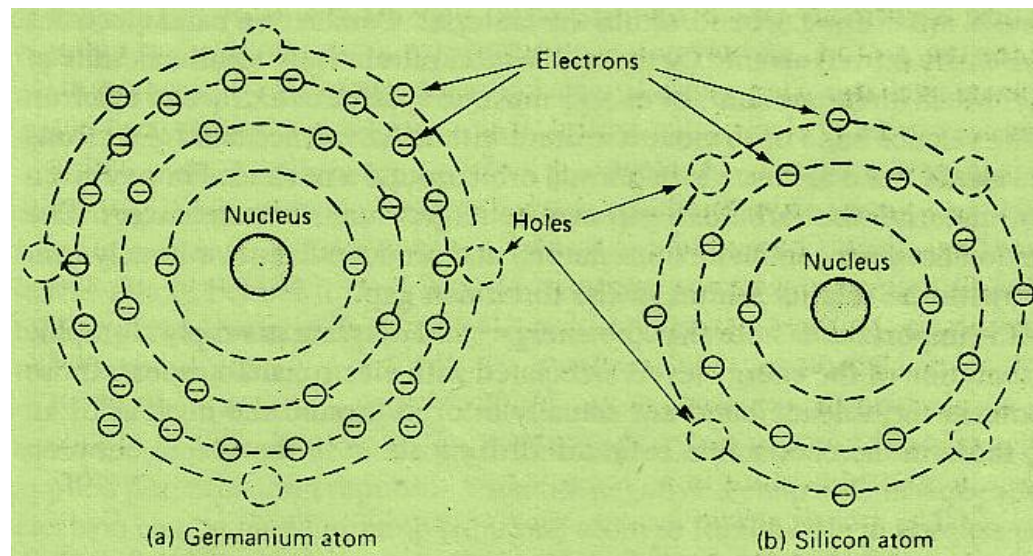
Atom, Electron Orbit, and Energy Levels

- Satellite? Nucleus: electrostatic force of attraction.
- $1.602 \times 10^{-19} \text{ C}$
- Mass? Proton, neutron, electron
- Atom is electrically neutral
- Positively charged: positive ion
- Negatively charged: negative ion
- Atomic number, atomic weight
- Si: 14, 28



Atom, Electron Orbit, and Energy Levels

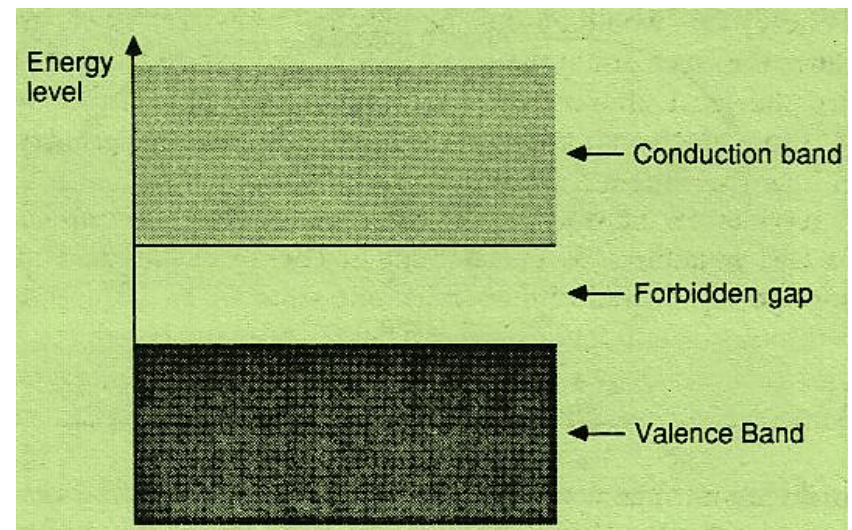
- ❑ Atoms >> two dimensional diagrams w. only certain orbital rings or shells
- ❑ Outer shell>> chemical/electrical char
- ❑ Valance shell, Valance electrons
- ❑ Hole in Si and Ge??
- ❑ Shell is associated w. an energy level



Energy Bands

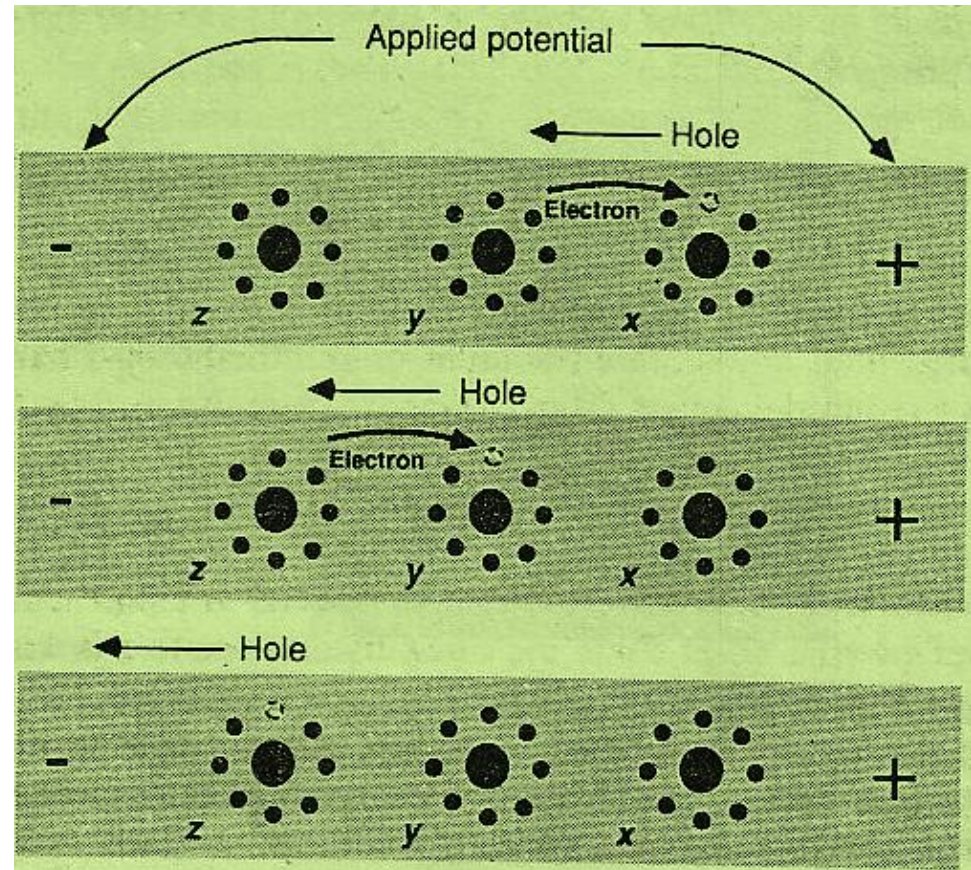
- ❑ ??Isolated atom to atoms in a solid
- ❑ Valance band and conduction band
- ❑ Energy gap and forbidden gap

- ❑ Electrons in the V-band are actually in orbit around the nucleus
- ❑ Electrons in the C-band are drifting about in the space bet atoms



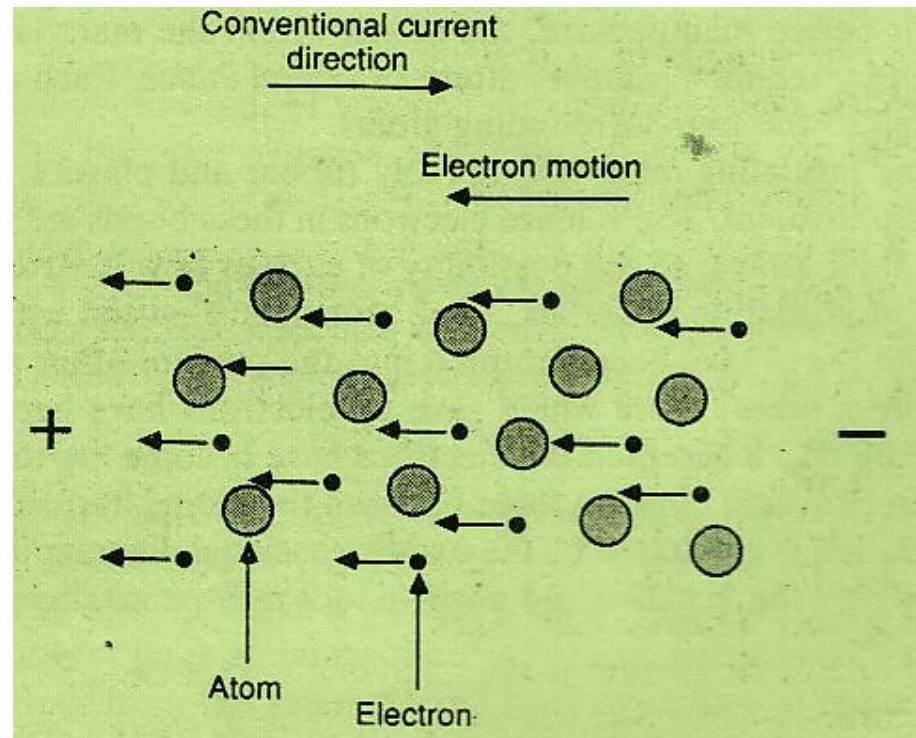
Conduction in Solids

- ❑ Conduction in a material when an applied voltage causes electrons to move in a desired direction
- ❑ Two process: electron motion and hole transfer
- ❑ Charge carriers
- ❑ Holes \gg greater mobility

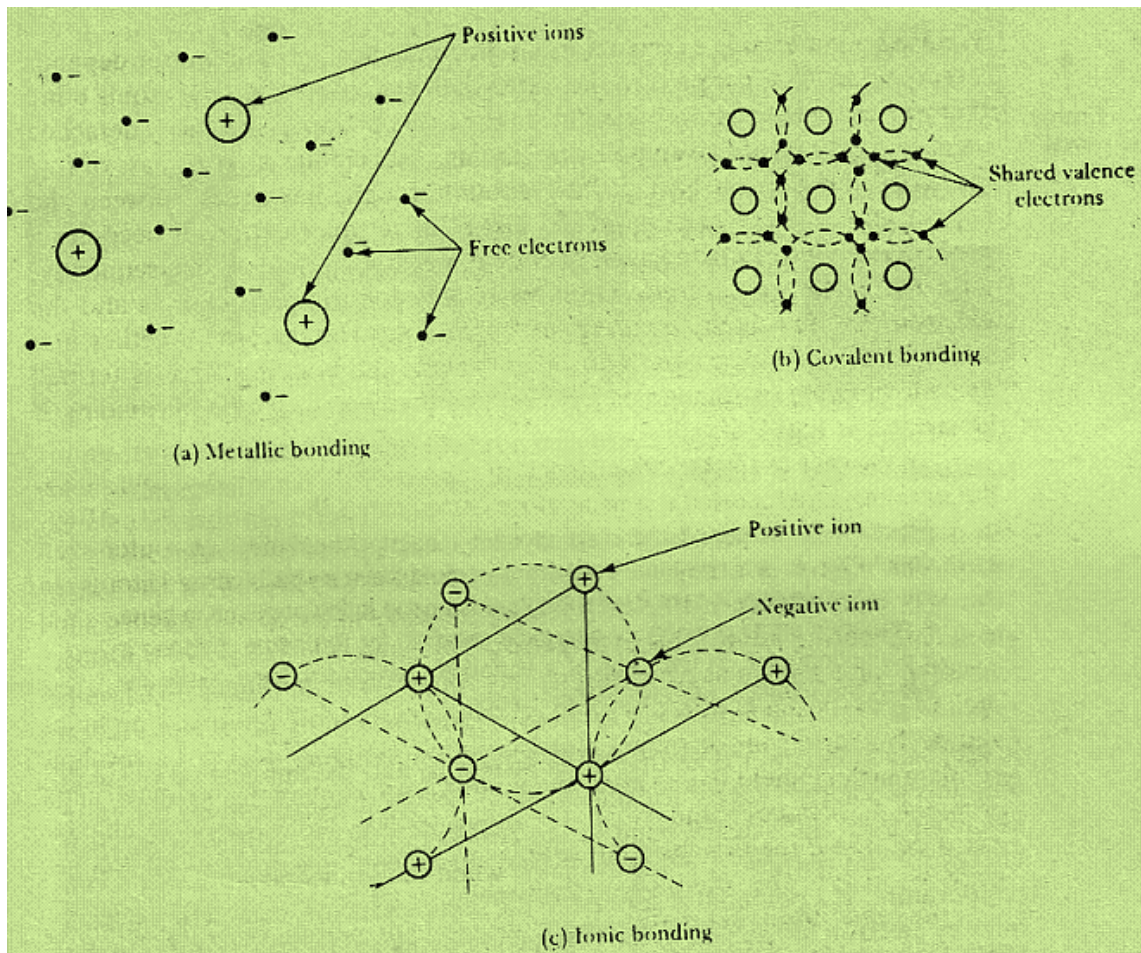


Conventional current and electron flow

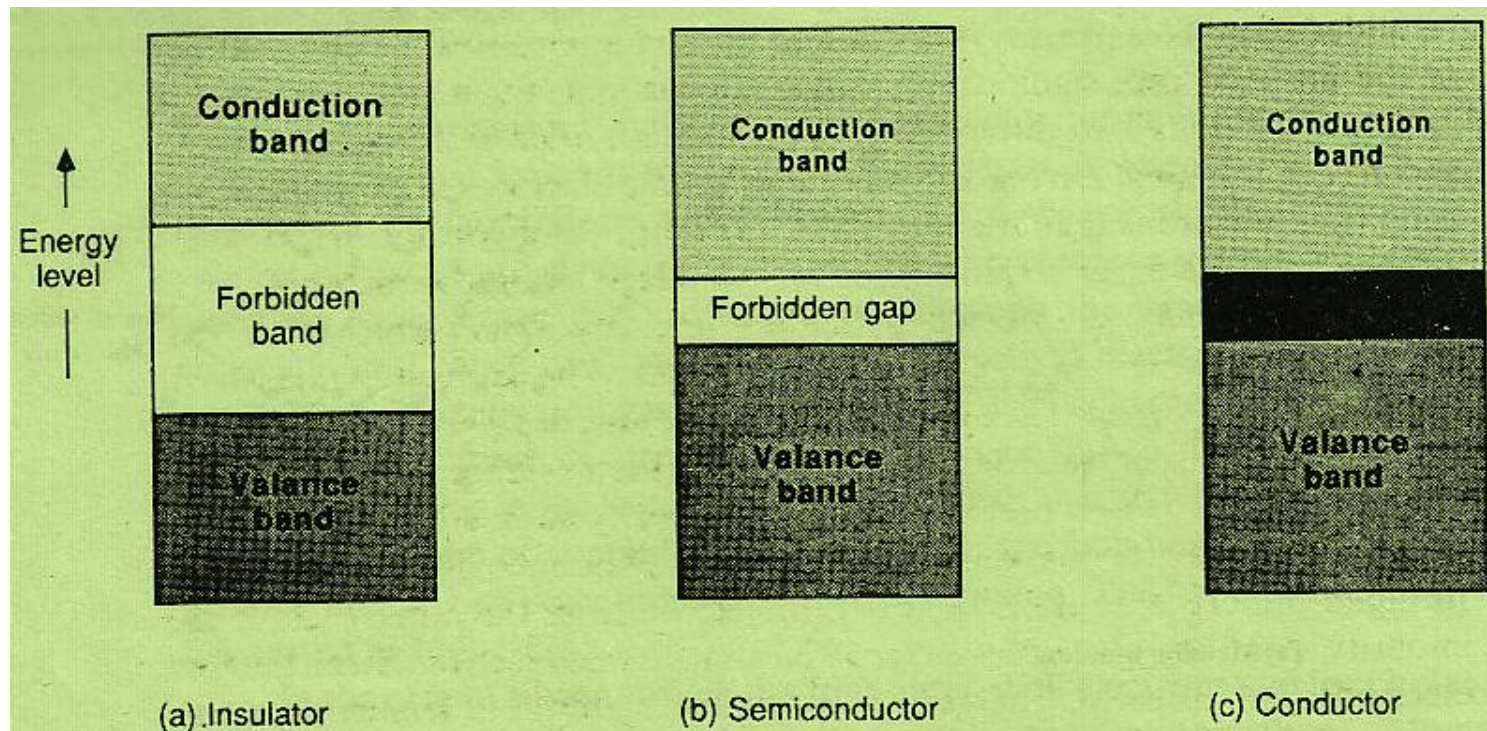
- ❑ Current flows from +ve to -ve is referred to as the conventional current direction
- ❑ Electron flow from -ve to +ve is known as the direction of electron flow



Bonding Forces Between Atoms



Conductors, Insulators, and Semiconductors



Conductor	$10^{-6} \Omega$
Semiconductor	10Ω
Insulator	$10^{14} \Omega$

Q & A

