



## [Analog Electronics]

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### SHORT COURSE DESCRIPTION

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1. Electronic devices such as diodes, transistors, and integrated circuits are made of a semiconductive material. To understand how these devices work, you should have a basic knowledge of the structure of atoms and the interaction of atomic particles. An important concept introduced in this lecture is that of the pn junction that is formed when two different types of semiconductive material are joined. The pn junction is fundamental to the operation of devices such as the solar cell, the diode, and certain types of transistors
2. The importance of the diode in electronic circuits cannot be overemphasized. Its ability to conduct current in one direction while blocking current in the other direction is essential to the operation of many types of circuits. One circuit in particular is the ac rectifier, which is covered in this chapter. Other important applications are circuits such as diode limiters, diode clippers, and diode voltage multipliers.
3. Two basic types of transistors and amplifiers are the bipolar junction transistor (BJT), and the field-effect transistor (FET), which we will cover in various fields. The BJT is used in two broad areas—as a linear amplifier to boost or amplify an electrical signal and as an electronic switch. Power amplifiers are normally used as the final stage of a communications receiver or transmitter to provide signal power to speakers or to a transmitting antenna. BJTs are used to illustrate power amplifier principles
4. Op-amps are used in such a wide variety of circuits and applications that it is impossible to cover all of them in one lecture, or even in one course. Therefore four fundamentally important circuits are covered to give you a foundation in op-amp circuits.
5. Active filters use transistors or op-amps combined with passive RC, RL, or RLC circuits. The active devices provide voltage gain, and the passive circuits provide frequency selectivity.
6. Oscillators are electronic circuits that generate an output signal without the necessity of an input signal. They are used as signal sources in all sorts of applications. Different types of oscillators produce various types of outputs including sine waves, square waves, triangular waves, and sawtooth waves.

### READING MATERIALS

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[Please list the materials students should read prior to or during class. Because of the short duration of the course and the fact that students travel to Korea from different countries, [please provide all materials in digital \(preferably PDF\) format](#) before the start of the ISS.]

- For the Integrated Circuits ;  
Microelectronic Circuits Sedra/Smith
- For the Discrete Circuits ;  
Electronic Devices Floyd
- All kinds of Books for Electronic Circuits are available

### COURSE REQUIREMENTS AND GRADING

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#### **Grading percentages .**

Attendance	20 %
Examination	40 %
Presentation	10 %

Team project 10 %  
Quiz 10 %

## **COURSE SCHEDULE**

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### **– WEEK I –**

Thursday (25 June)

General Review of Electronic circuit

Friday (26 June)

Semiconductor physics

### **– WEEK II –**

Monday (29 June)

Diodes and their applications

Tuesday (30 June)

Special purpose diode

Wednesday (1 July)

Bipolar junction transistor (BJT)

Thursday (2 July)

BJT bias circuits and amplifiers

### **– WEEK III –**

Monday (6 July)

Power amplifiers

Tuesday (7 July)

Field Effect Transistor circuits

Wednesday (8 July)

Field Effect Transistor amplifiers

Thursday (9 July)

Amplifier frequency response

### **– WEEK IV –**

Monday (13 July)

Feedback concepts and applications in amplifier

Tuesday (14 July)

The operational amplifier and basic OP amp circuits

Wednesday (15 July)

Special purpose OP amp circuits

Thursday (16 July)

Active filters and oscillators

Friday (17 July)

Summary