



EE331 Power Electronics Course

- **Course objectives:**

1. Introduce to students the theory and applications of power electronics systems for high efficiency, renewable and energy saving conversion systems.
2. Prepare students to know the characteristics of different power electronics switches, drivers and selection of components for different applications.
3. Develop students with an understanding of the switching behavior and design of power electronics circuits such as DC/DC, AC/DC, DC/AC and AC/AC converters.

- **Course description:**

This course provides the student with an introduction to the power electronics circuits including the characteristics of power semi-conductor devices, diode rectifiers, thyristors, commutation techniques, controlled rectifiers, ac voltage controllers, choppers, inverters, and introduction to renewable energy sources and motor drives.

- **Course outline:**

- 1-Introduction to Power Electronics.
- 2-Power Semi-conductor Devices.
- 3-Uncontrolled Rectifier (AC-DC converter)
- 4- Controlled Rectifier (AC-DC SCR converter)
- 5-Choppers (DC-DC converters)
- 6-Ac voltage controller. (AC-AC converter)
- 7-Inverters (DC-AC converter).

- **References**

1. Muhammad H. Rashid, *Power Electronics Handbook*. Elsevier, 2018.
2. Daniel W. Hart, *Power Electronics*. McGraw-Hill. 2010
3. Issa Batarseh, Ahmad Harb. *Power Electronics Circuit Analysis and Design*. Springer, 2018.
4. N.Mohan et al, *Power Electronics*, John Wiley
5. Timothy L. Skvarenina, *The Power Electronics Handbook*. CRC Press, 2002.
6. N.Mohan et al, *First Course on Power Electronics and Drives*, 2003.
7. R. W. Erickson, *Fundamentals of Power Electronics*, Kluwer Academic Publishers, 2004.

- **Continual Course Improvement:**

This course is under constant revision in order to improve the learning outcomes for all students.