

Course Type	Course Code	Name of Course	L	T	P	Credit
OE	ECO302	Power Electronics	3	0	0	9

Course Objective

The objective of the course is to present an introductory idea on power electronics, with an emphasis on various components, their properties and methods of analysis.

Learning Outcomes

Upon successful completion of this course, students will:

- have a broad understanding of power electronics
- have a high-level understanding of major components of power electronics and their functions and characteristics
- be able to analyze circuits by their components and working principles

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	What is power electronics, power processor and a converter, ideal switch characteristics, power losses in switches, Power semiconductor devices: power diodes, SCR, LASCR, power BJT, power MOSFET, IGBT, GTO, SITs, MOS controlled Thyristor.	10	Introductory overview on power electronics and basic concepts of switches, semiconductors, diodes and other devices used as components in circuits.
2	Control characteristics of power devices, Types of power electronic circuits: rectifier, ACVC, inverter, chopper, cycloconverter, static switches, merits/demerits of power electronics, multidisciplinary nature of power electronics, prominent manufacturers of devices, Power transistors, di/dt and dv/dt protections, opt coupler	10	Understanding of control characteristics of power devices, and types of circuits and their multidisciplinary natures.
3	Thyristor: Thyristor characteristics, two transistor model of thyristor, factor causing thyristor turn on, thyristor types, thyristor firing circuits: R-firing circuit, R-C firing circuit, UJT triggering.	10	Understanding of Thyristor and their different models and circuit designing.
4	Thyristor commutation techniques: meaning of commutation, methods of commutation of SCRs: line commutation, load commutation,	4	In depth understanding of Thyristor commutation techniques.
5	AC voltage Controllers: types of ACVC, single-phase phase controlled ACVC with R load, Controlled Rectifier: types of controlled rectifiers, applications of controlled rectifiers, working principal of phase controlled rectifier, Chopper: working principal of chopper, Inverter: working principal of single phase inverter, Circuit with switches and diodes: R connected to DC source, R-C and R-L connected to DC source.	8	Comprehensive concepts of different controllers and rectifiers and chopper circuits and their applications in various electrical circuits.

Text Books:

- Power Electronics-Circuit Devices and Applications – M. H. Rashid

Reference Books

- Power Electronics – P.S. Bimbhra
- Power Electronics-V. Subrahmanyam (New Age International Publisher Pvt. Ltd., Bangalore)
- An Introduction to Thyristor and Their Applications- M. Ramamoorthy (East-West Press Pvt. Ltd.)