E6 225 Aug 3:1

Advanced Power Electronics

Instructor

Kaushik Basu
Email: kbasu@iisc.ac.in

Teaching Assistant

Email:

Department: Electrical Engineering

Course Time: Tue Thu 10:00-11:30 AM

Lecture venue:

Detailed Course Page:

Announcements

Brief description of the course

This course covers a range of advanced power electronic converters. Typically for each type of power conversion, e.g. single phase unidirectional AC to DC, the following aspects will be covered: different converter topology with switch implementation, modulation, dynamic modeling and stability, closed loop controller design, filter design and applications. Simulation and design of a given converter topology for a particular type of power conversion will also be done. This course will also include advanced aspects of high frequency magnetic design.

Prerequisites

Power Electronics (E6 201) or Design of Power Converters (E6 202) is essential.

Syllabus

Rectifiers: Line commutated, unidirectional power factor correction (PFC), bi-directional, rectifiers with isolation. AC to AC power converters: Matrix converters, Multistage conversion: voltage link and current link topology, High frequency link converters. DC to DC converters: Dual active bridge, Resonant converters. Inverters: Multilevel, Inverters for open ended load configurations, Resonant inverters. High frequency

magnetics: Modeling and loss estimation, Inductor and transformer design. Thermal design. Emerging power semi-conductor devices.

Course outcomes

Prepare students for research

Grading policy

2 Mid Terms 15% each

Final 40%

Assignment 30%

Assignments

Resources