



DESIGN OF POWER ELECTRONIC CONVERTERS

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PRE-REQUISITES : Introductory course on power electronics.

INTENDED AUDIENCE : People with interest in power electronics, especially hardware design.

INDUSTRIES APPLICABLE TO : Companies involved in power electronics product designing and its applications

COURSE OUTLINE :

Undergraduate level courses on power electronics teach different power converter circuits and methods to analyze them. But all jobs related to power electronics need good knowledge of designing hardware. Proper hardware design in power electronics involves knowledge of several topics which are beyond the scope of a core course in power electronics. This course intends to fill this gap.

In this course, students will learn the important concepts needed to design proper power electronic hardware, simulation tools, proper designing of power PCB, designing magnetics, reducing electromagnetic interference etc. By the end of course students should be able to design and test any power electronic converter on their own.

ABOUT INSTRUCTOR :

Prof. Shabari Nath is an Associate Professor in the Department of Electronics and Electrical Engineering, Indian Institute of Technology Guwahati, Assam, India, since 2021. She was Assistant Professor in the same institute from 2014 to 2021. Prior to that, she was a Product Design Engineer with Cummins, Inc., USA, for two years. She completed the B.E. degree in electrical engineering from Jabalpur Engineering College, Jabalpur, India, in 2005, the M.Tech. degree in electrical engineering from the Indian Institute of Technology Bombay, Mumbai, India, in 2008, and the Ph.D. degree from the University of Minnesota, Minneapolis, MN, USA, in 2012. Her research interests include multiport converters, solid state transformers, power electronic converters for power systems, renewable energy systems, charging of electric vehicles and smart microgrids.

COURSE PLAN :

Week 1: Analysis of power electronic converters

Week 2: Power semiconductor devices

Week 3: Gate drivers

Week 4: Snubber design

Week 5: Thermal Design

Week 6: Magnetics Design

Week 7: Electromagnetic interference in power electronic converters

Week 8: Familiarity and design on power electronic hardware