

IIT Mandi

Proposal for a New Course

Course Number	: EE 527P
Course Name	: Practicum on Analysis and Design of Power Electronic Converters
Credits	: 0-0-3-2
Prerequisites	: EE309 and EE309P - Power Electronics or Equivalent
Intended for	: BTech Final year and M.Tech in Power Electronics and Drives (PED)
Distribution	: Core for M.Tech. in PED, Elective for final year Electrical Engineering and other PG
Semester	: Odd (Aug-Dec)

- 1. Preamble:** Practicum on Analysis and Design of Power Electronic Converters is a laboratory course which is designed to accompany the ongoing course EE5xx (Analysis and Design of Power Electronic Converters), both of which are core courses for M.Tech (PED) students in their first semester. These courses together establish a strong foundation for Analysis and Design of Power Electronic Converters along with a laboratory hands-on component which enables the students to appreciate real-life implementation constraints. This course requires the knowledge of basics of power electronics, and bridges the gap between these pre-requisite courses and more advanced courses in power electronics.
- 2. Course Modules with Quantitative lecture hours:** This is a laboratory course with 3-hour sessions per week. Following is the list of course modules and experiments.

Part-I

Part-I will involve experiments related to analysis, design, control and applications of power electronic converters

- Basic and few advanced AC-DC, DC-AC, DC-DC and AC-AC converters: Analysis and design (11 hours)
- Closed loop control of power electronics converters (10 hours)
- Demonstration of few power electronics converter applications such as renewable grid interactive converter, power factor correction circuits etc. (6 hours)

Part-II (15 hours)

Part-II will involve a design project related to analysis, design and control of power electronic converters

3. Textbook:

Lab. experimental manuals will be provided for Part-I.

4. References:

1. Mohan N., Undeland T.M. and Robbins W.P., "Power Electronics –Converters, Applications and Design", 3rd Ed., Wiley India. 2008
2. Power Electronics: Essentials & Applications, by L. Umanand, Wiley India (2009)
3. R.W. Erickson, D. Maksimovic, "Fundamentals of Power Electronics" Kluwer Academic Publishers, second edition.
4. Bin Wu, "High-Power Converters and AC Drives", IEEE Press, A John Wiley & Sons, Inc Publication, New York, 2006.
5. Rashid M., "Power Electronics- Circuits, Devices and Applications", 3rd Ed., Pearson Education.
6. A. I.Pressman, "Switch Mode Power Supply Design", McGraw-Hill, 1999, New York.
7. R.S. Ramshaw, "Power Electronics Semiconductor Switches", Chapman & Hall, 1993.
8. D. Grahame Holmes, Thomas A. Lipo "Pulse width modulation for power converters: principles and practice", A John Wiley & Sons, INC, 1st Ed., 2003.

9. Similarity Content Declaration with Existing Courses: About 10-15% with EE309P

10. Justification for new course proposal if cumulative similarity content is > 30%: N/A