ADVANCE POWER ELECTRONICS AND CONTROL

COURSE OUTLINE:
This course is suitable for UG (B.Tech) and M.Tech studying in Advance Power Electronics. This course describes modern topics of Power Electronics in terms of switches, topologies and control. Moreover, the proposed course explains the application of Power Electronics in drives, Power Systems and Renewable Energy and other utility. This application of the Power Electronics including all these fields has been discussed in detail with advanced switching topology and modern control techniques. Students of B.Tech and M.Tech and participants of industry will find this course beneficial not only for GATE and other competitive exams, but also help them to upgrade for the fast changing Power Electronics industry.

ABOUT INSTRUCTOR:
Dr. Avik Bhattacharya joined in IIT Roorkee in February 2014. His fields of interest are FACTS, Power Quality, Solid state transformer, SIC and GaN devices. He has taught Power Electronics in IIT Roorkee for two years. Dr. Bhattacharya, before joining IIT Roorkee, has worked in power electronics industries. His teaching thus has a proper blend of industry academic orientation.

COURSE PLAN:
- **Week 01**: Basic Concept of Switches and Device Physics
- **Week 02**: Device Physics, Application and Analysis of Switches and Single Phase Converter
- **Week 03**: Single Phase Converter, Three Phase Converter, Multipulse Converter and Effect of Source Inductance and PWM Rectifiers
- **Week 04**: PWM Rectifiers and Power Factor Improvement Techniques and non-isolated DC-DC converters
- **Week 05**: Non-isolated and isolated DC-DC Converters and Choppers
- **Week 06**: Isolated DC-DC Converters IV and VSI & CSI, MLI and ZSI
- **Week 07**: SVM, AC to AC Converters, Cycloconverter and Matrix Converter
- **Week 08**: Linear Control in Power Electronics, Nonlinear Control in Power Electronics, Applications and Conclusions