



Advanced Power Electronics for Future Energy Systems

[Course Code: 171027D05]

Overview

Extensive research in power electronics technologies in renewable energy area is predictable to grant efficiency improvements in smart grid evolution. The generated power output from renewable energy source such as photovoltaic panel or wind turbine, is generally difficult to control, therefore a power electronics converter capable of implementing high-speed and high-accuracy control is required for the mass adoption of renewable energy in smart grid. Recently, intelligent control techniques have been researched and implemented to cater the future energy demand effectively and efficiently. Power electronics converters and enhanced control techniques can support a grid with reactive power and protect the equipment during severe grid disturbances. Soft switching converters operated at high frequency results in efficiency improvement and reduction in size and weight of the system which is the prime requirement of power electronic converter for renewable energy applications. It also improves the converter power density. This is an advanced power electronics course devoted to the application of three-phase power converters in renewable energy, high-voltage dc transmission (HVDC) and microgrid systems. The audience is expected to be already familiar with the fundamental concepts of power electronics, control and power systems. The course emphasizes state-of-the-art technologies and also reviews future R&D needs of the industry.

Dates of Course	08 – 12 Jan, 2018
Course Content	<ul style="list-style-type: none">• Voltage-Source Converters – Circuits and Operation• Voltage-Source Converters – Control for Grid Application• Photovoltaic Energy Conversion and Control• Wind Energy Conversion and Control• High-Voltage DC Transmission• System Stability, Modeling and Analysis• High efficient converter based on SiC MOSFET and IGBT• Advanced magnetic material for inductor and transformer design• Multilevel converters for renewable energy source conversion <p>Apart from above Lectures, there will be sufficient number of Laboratory Sessions during the Course on Power Electronics Converter Implementation for renewable energy applications.</p>
You Should Attend If...	<ul style="list-style-type: none">• You are an Electrical Engineer or research scientist interested in designing power electronics and electrical drive system with current technology.• You are an industrial professional working on power electronics and drives system and wish to share, learn .• you are a student or faculty from academic institution interested in learning how to do research on GPR system or subsystem or want to work with GPR imagery for geological interpretation. <p>Number of participants for the course will be limited to Thirty.</p>
Course Fees	<p>The participation fees per person for attending the course is as follows:</p> <p>Participants from abroad : US \$ 500 Industry/ Research Organizations : Rs. 5,000/- Academic Institutions : Students: Rs. 2360/- (For SC/ST students course fee is Rs. 1180/- only) Non-Students: Rs. 3540/-</p> <p>The above fees include all instructional materials, free internet facility, tea and snacks. The course fee is inclusive of 18% GST as per institute norms. The participants may avail single bedded shared accommodation and food (breakfast, lunch and dinner) if requested on additional payment and availability basis.</p>

The Foreign Faculty



Dr. Jian Sun joined the faculty at Rensselaer Polytechnic Institute (RPI) in 2002, where he is currently a Professor in the Department of Electrical, Computer and Systems Engineering. He is also Director of the Center for Future Energy Systems (CFES) funded by New York State government. His research interests are in the general area of power electronics and power systems, with a focus on modeling, control and stability of renewable energy and high-voltage dc transmission systems. As Director of CFES, he is responsible for strategic directions of the Center, its research and industry collaboration programs, as well as overall management of Center staff and operation. He published more than **200** research papers in refereed international journals/conferences. Dr. Jian is providing consultancy to more than **15** industries worldwide. He credits **11** patents in his name. Dr. Sun received his Dr.-Ing degree from the University of Paderborn in Germany. Prior to joining RPI, he spent five years at the Advanced Technology Center of Rockwell Collins working on power electronics for aircraft power systems, and was a Post-Doc Fellow at Georgia Tech from 1996 to 1997. His services to the professional society included serving as Editor-in-Chief of IEEE Power Electronics Letters from 2008 to 2014 and as Treasurer of IEEE Power Electronics Society since 2013. He received the IEEE PELS Modeling and Control Technical Achievements Award in 2013 for contribution to averaged modeling and ac power electronic system stability. He is a Fellow of IEEE and has consulted to a number of companies on technical matters related to the subject of this presentation.

The Host Faculty



Vijay B. Borghate received the **B. E. degree** in Electrical Engineering from Government Engineering College, Amaravati, India, in 1982 and **M. Tech. degree** in Electrical Engineering from VRCE, Nagpur, in 1984. He has been awarded **Ph. D. degree** by VNIT, Nagpur University, Nagpur in 2007. He is currently working as **Professor** in the Department of Electrical Engineering, Visvesvaraya National Institute of Technology, Nagpur, (India). He is presently the Dean (Student Welfare). He has more than 30 years of teaching and research experience.



Pradyumn Chaturvedi (SM'17) received the B. E. degree in Electrical Engineering from Samrat Ashok Technological Institute, Vidisha, M.P., India, in 1996 and M. E. degree in Power Electronics from Rajiv Gandhi Technical University, Bhopal, M.P., India in 2001. He has been awarded Ph. D. degree by National Institute of Technology, Bhopal, M.P., India in 2010. He is currently working as Assistant Professor in the Department of Electrical Engineering, Visvesvaraya National Institute of Technology, Nagpur, (India). He has published more than **70** research papers in International/National refereed Journals/Conferences. He holds the position of Member Asian Council of Science Editors Dubai, Member International Editorial Board International Journal "IOSR Journal of Electrical and Electronics Engineering". He has Completed **02** R & D Projects. Under his supervision 01 Ph.D. have been awarded and 02 are ongoing. He has been appointed as Expert Member of Doctoral Committee at various universities in India. He is also Track Chair/Session Chair in various national and international conferences (IEEE PEDES 2016, IEEE ITEC India 2017, IEEE ICIT 2018). He is holding the position Member, Executive Committee, IEEE Nagpur Subsection. He is regular Reviewer of research articles for IEEE Transaction on Power Electronics, IEEE Transaction on Industrial Informatics, Electrical Engineering (Springer's), International Journal of Electronics (Taylor & Francis), International Journal of Power Electronics (Inderscience Publisher), Electric Power Components & Systems, IEEE Student Conference SCEECS. His research interests include Power Electronics, Improved Power Factor Converter, Power Quality Improvement, Multilevel Converters, Electric Drives, Renewable Energy Harvesting and Fault Tolerant Converters.

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Patron

Dr. N. S. Chaudhary
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For Registration:

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