Smart Grids, for many the next big technological revolution since the invention of the internet, will play an important role in tomorrow's societies. Governments around the world are currently pumping large sums of money into Smart Grid research, development and deployments, their aims being manifold. Smart grids have the potential to *reduce carbon dioxide emissions* through the integration of distributed renewable energy resources, energy storage and plug-in hybrid electric vehicles. Moreover, they can
increase the reliability of the electricity supply
(reduced blackout rate) by real-time measurement, monitoring and control of the generation, transmission and distribution electricity networks. Further, they can render the utilization of power generation stations and electricity transport infrastructure more
efficient
, deploying dynamic pricing and demand response strategies. In addition to these benefits, at this stage in the game, we cannot even imagine the products and services that will evolve as the smart grid takes hold. Nevertheless, we are confident that the engine of innovation will find new ways to exploit the potential of smart grids, in the sequel creating many more jobs than it eliminates through automation.

Besides an update to power electronics sensing, monitoring and control technology, a key smart grid enabler are the advances that in the last decades have been made in the area of telecommunications. The communication aspects of smart grids are at the heart of this course. The main sections are:

1. Electric Energy Systems: Past, Present and Future
2. Introduction to Smart Grid Communications
3. Applications and Communication Requirements
4. Sensing, Automation and Control: Protocols and Standards
5. Wireless Communications
6. Wireline Communications
7. Optical Communications
8. Interoperability
9. Security
10. Case Studies

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