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*Electrical & Computer Engineering*  
**S E M I N A R**  
Louisiana State University

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**System of Systems-Based  
Decision-Making for Future Power Grids**

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**Abstract**—A modern power system is composed of many individual entities collaborating with each other to operate the entire system in a secure and economic manner. These entities could have different owners and operators with their own operating rules and policies, and it makes the decision-making process in the system challenging. In this talk, a system of systems (SoS) engineering framework is presented for optimally operating the modern/future smart grids. The presented SoS framework defines each entity as an independent subsystem with its own regulations. Since the independent subsystems are working in an interconnected system, the operating condition of one might impact the operating condition of others. According to the independent subsystems characteristics and connection between them, an optimization problem is formulated for each independent subsystem. In order to solve the optimization problem of each subsystem and to optimally operate the entire SoS-based power system, decentralized decision-making algorithms are developed. Using these algorithms, only a limited amount of information is exchanged among different subsystems, and the operators of independent subsystems do not need to exchange all the information, which might be commercially sensitive, with each other. Furthermore, the presented decentralized optimization algorithms could obtain the optimal operating point of large-scale power systems faster than conventional centralized methods. Two examples are studied to demonstrate the effectiveness of the presented decision-making framework.

**When:** Thursday, 5 March 2015, 9:30 - 10:30  
**Where:** Room 117 EE Building  
**Info:** <http://www.ece.lsu.edu/seminar>

