

# ***Integration of PHEV with Wind Energy***



*IPRO 311 – Integration of Plug-in Hybrid Electric Vehicles  
and Renewable Energy Systems*

*Dr. Alireza Khaligh*

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## Multidisciplinary Interprofessional (IPRO<sup>SM</sup>) Course

- Engaging multidisciplinary teams of students in semester-long undergraduate projects based on real-world topics.
- Integrating ethics as an independent part of the project.
- Teams may include 5 to 15 students
  - All academic levels
  - Across professional programs:
    - Engineering
    - Science
    - Business
    - Law
    - Psychology
    - Design
    - Architecture

## Multidisciplinary Interprofessional (IPRO<sup>SM</sup>) Course

- **Integration of both**
  - **Vertical** (bridging academic levels)
  - **Horizontal** (bridging professional programs) dimensions
- **Stimulating student interaction across the boundaries of individual disciplines and experiences**
- **Power and energy engineering-oriented students:**
  - **Appreciation for non-technical considerations**
- **Other professions:**
  - **Greater insight concerning research and technology development**

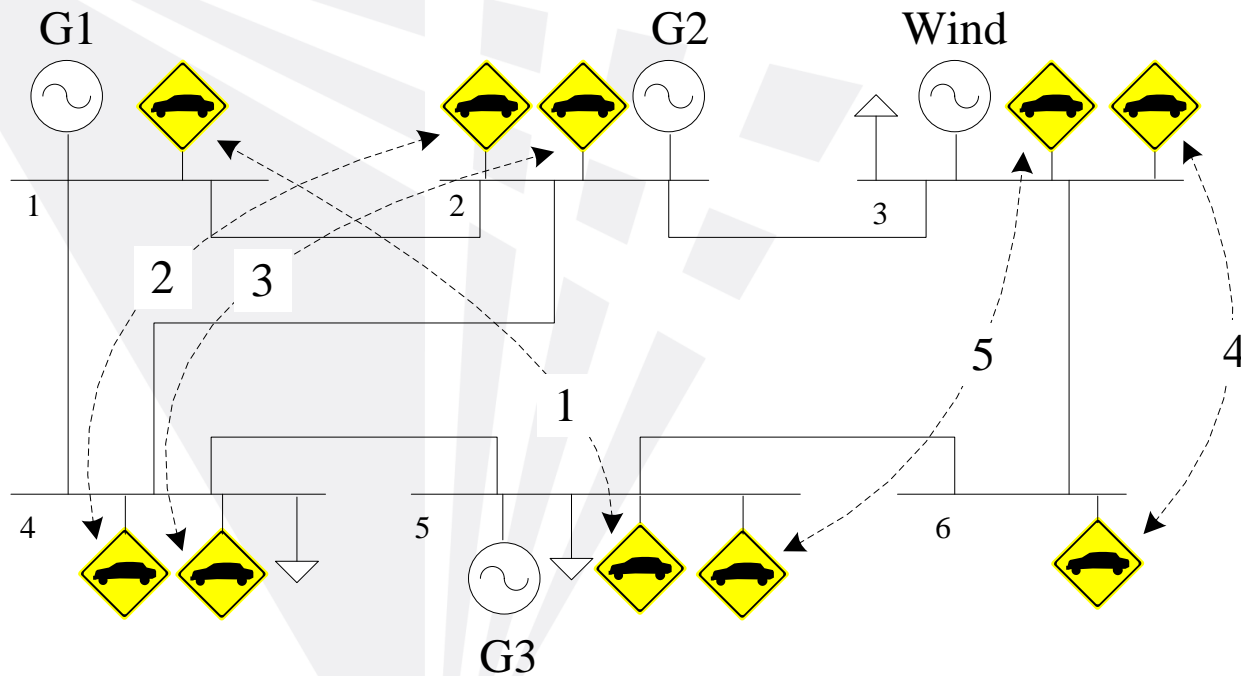
# ***Integration of PHEV with Wind Energy***

- **Investigating the effect of integrating 20% of wind energy in current power system in terms of operational cost**
- **Supplementing additional power demand of electric power network through integration of PHEVs**
- **Facilitating Vehicle-to-Grid (V2G) integration by taking advantage of Energy Storage System (ESS) of PHEVs**

## ***Team Roster***

- **Team Advisor:** Dr. Alireza Khaligh
- **Team leader:** Malik Ajose, Joeseeph Krause
  - James Lee: Electrical Engineering, Optimal cost management
  - Peter Ryszkiewicz: Electrical Engineering, Driving habit and ESS
  - Malik Ajose: Architecture, Charging PHEVs and battery life
  - George Pop: Architecture, Operational cost/wind energy curtailment
  - Robert Veitch: Computer Science, Optimal cost management
  - Byron Enriquez: Mechanical Engineering, Operational cost/wind energy curtailment
  - Joseph Krause: Mechanical Engineering, Smart grid interaction of PHEVs & wind state of the charges requirements of PHEVs
  - Joseph Charles: Mechanical Engineering, Driving habit and ESS

# Integrating Electric Vehicles and Wind Generation in Electric Power Systems



# Expected Outcomes

- **Reduce operational cost of the electric power system**
- **Reduce the peak demands**
- **Reduce CO<sub>2</sub> emission, eco friendly**
- **Take full advantage of utilizing wind energy**  
**(Using wind energy at night to charge PHEV)**