NEW IAP 2022 Class!
Computational modeling tools for promoting low-carbon electricity

Stellar Website http://stellar.mit.edu/S/project/mitei-iap22/

DATES: **5** sessions, **January 24 to 28** (9am - 1pm)
LOCATION: E51-376
INSTRUCTORS: Professors from **Comillas University** and **MIT**
PREREQUISITES: None (some GAMS/Python familiarity is helpful)
LIMITED: 30 participants

<u>Priority sign-up by Jan 19th</u>. Email Pablo Duenas (**pduenas@mit.edu**) and Karen

Tapia-Ahumada (**katapia@mit.edu**)

This 5-session intensive course presents power system **analysis techniques** that will help in **modeling** and understanding the role of **electric power systems** in a **carbon-constrained** economy. The massive deployment of **intermittent renewables energy sources (RES)**, the anticipated surge of active **demand response** or the development of **smart grids** are among the challenges that must be faced by the **mathematical** models for **optimization**, analysis and simulation of the **complex decision-making** processes in power systems. Apart from a theoretical description of the models, the instructors will provide the students with a **collection of prototypes** that will allow them to run study cases and to understand the effect of the different mathematical formulations on the outcomes. The use of these models in some **real-world applications** will also be presented.

Part I: Transmission constrained economic dispatch and unit commitment
  1. Economic dispatch and unit commitment with RES
  2. Stochastic unit commitment with RES
Part II: Operation planning
  3. Mid-term hydro-thermal coordination
  4. Deterministic and stochastic model
Part III: Microgrids
  5. A simplified model for scheduling a microgrid
  6. Resiliency through multi-microgrid
Part IV: Generation expansion planning
  7. Generation expansion planning
  8. GenX model
Part V: Transmission expansion planning
  9. Transmission expansion planning
  10. openTEPES model

MITei
MIT Energy Initiative

COMILLAS
UNIVERSIDAD PONTIFICIA
ICAI   ICADE   CIHS