EENG489 – Computational Modeling on Energy Systems and Power Electronics

BACKGROUND

Computational Modeling on Energy Systems and Power Electronics History

2013 – First time offered as ‘Special Topics’
2014 – ‘Special Topics’
2015 – First time I taught with a permanent course code → EE elective.
2016 – An instructor taught with my notes. I expanded and published a textbook (IEEE/Wiley).
2017 – This was the second time that I taught as a EE Elective.
2018 – I will teach the revised version after the Summer 2017 Cohort.

WHAT IS CHANGING

• The revised course will be developed through a Problem and Problem Based Learning. Activities will be based on inductive, inquiry.
• For each week I am planning an active learning based lesson for the “lecture type meeting” plus a project-oriented group work. This course will make students motivated on design, problem-solving, decision making, investigative activities.
• A learner oriented approach will encompass the complex nature of student motivation and knowledge required to engage in cognitively complex work.

EXPECTED RESULTS

• EE students will become better in taking an electrical engineering energy system problem into analysis with equations, implementing modeling approaches, conducting computer oriented studies and hardware control implementation, and will be conducting undergraduate research in advanced concepts. The revised course provides engineering learning development based on PBL. Students will obtain a deep experience in analysis. Students will improve their computational modeling skills with:
  (i) words, (ii) detailed descriptions, (iii) clear explanations documented in reports, presentations, videos, and posters,
  (iv) improved diagrams and using pictures and (v) rich analysis of modeling and simulations of electrical engineering energy systems math, engineering and real-world implementation.
• Students will be prepared for advanced research by writing IEEE guidelines formatted paper with good quality to be accepted in an IEEE conference (at least). The students will prepare a poster and an oral presentation of the paper in a mini-conference environment at the end of the course. The students will be capable of reading and study state of the art in their project based experience and approach their contribution for energy systems of the future power grid.

Problem-Based and Project Based Learning approach is application of scientific method on each and every step throughout the whole course.

The Scientific Method as an Ongoing Process

"Knowing is not enough; we must apply. Willing is not enough; we must do."
~ J.W. von Goethe

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