

**TO:** The Faculty of the College of Engineering  
**FROM:** The Faculty of the School of Electrical and Computer Engineering  
**RE:** ECE 633 Changes in Terms Offered, Class Setup, Prerequisite, Description and Content

The faculty of the School of Electrical and Computer Engineering has approved the following changes in ECE 633. This action is now submitted to the Engineering Faculty with a recommendation for approval.

**From:** **ECE 633 – Modeling and Simulation of Power System Components**  
Sem.1. Class 2, Lab 1, cr. 3.  
PrerequisitePrerequisite: [ECE 425](#) or [432](#). Authorized equivalent courses or consent of instructor may be used in satisfying course pre- and co-requisites.

Recommended for those interested in learning to use computer simulation to investigate the dynamic and controlled behavior of electrical power components. Beginning with an introduction to MATLAB/SIMULINK, the course goes through the key steps of modeling, implementing and verifying the simulation of single and three-phase transformers, single and three-phase induction machines, three-phase wound field synchronous machines and permanent magnet machines useful in power applications, each case amply illustrated in projects around some interesting topics. Students are expected to implement and verify about 10 simulation projects and also discuss observed behaviors on topics such as inrush current in transformers, motoring, generating and braking operation of machines, and pulsating torque from subsynchronous resonance.

**To:** **ECE 633 – Modeling and Simulation of Power System Components**  
Sem. 2 of even years. Class 3, cr. 3  
Prerequisite: ECE 610.  
Prerequisites by Topic: Programming in MATLAB

Covers modeling, implementation and verification techniques for dynamic simulation of power system components. Examples of components are: transmission line, transformers, induction machines, synchronous machines. Assigned projects involve implementation and verification of simulations, and also discussion of observed behaviors.

**Reason:** The course description and content have been changed to reflect the updated content of the course.

## **ECE 633 – Modeling and Simulation of Power System Components**

**Required Text:** *Dynamic Simulation of Electric Machinery*, Chee-Mun Ong, Prentice-Hall, 1997, ISBN No. 0-13-7237855.

<i>Weeks</i>	<i>Principal Topics</i>
1	Modeling philosophy for dynamic simulation of power system components
1.5	Introduction and exercises on the use of MATLAB/SIMULINK
2	Modeling of electromagnetic transients in transmission lines using distributed and lumped parameter models. Projects on implementation and verification methods.
2	Modeling of transformers. Projects on implementation and verification methods.
4	Modeling of induction machines. Derivation of linearized model. Projects on implementation and verification methods.
4.5	Modeling of synchronous machines. Derivation of linearized models. Discuss machine models used in transient stability studies. Modeling of excitation system, power system stabilizer, torsional shaft, and permanent magnet field machines. Projects on implementation and verification methods.