

<b>COURSE</b>	Name : Transient Stability in Power Systems
	Code : EE185516
	Credit(s) : 2
	Semester : (Elective Course)

### Description of Course

Definition and classification of stability in power systems, generator modeling, transient stability for single machine using the equal area criteria method, transient stability for multi machines using the development of the equal area criteria method, transient stability for multi machines using time domain simulation method, transient stability for multi machines by direct calculation of critical disconnection, transient stability for multi machines using boundary controlling unstable (BCU) equilibrium point method, transient stability for the multi machine using BCU shadowing method, transient stability for a single machine using critical trajectory, transient stability for the multi machine using critical trajectory based loss of synchronization method, transient stability for multi machine using critical trajectory based critical generators method. Calculate Critical Clearing Time and apply in Power system.

### Learning Outcomes

#### Knowledge

(P02) Mastering engineering concepts and principles to develop the necessary procedures and strategies for systems analysis and design in the areas of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

#### Specific Skill

(KK01) Being able to formulate engineering problems with new ideas for the development of technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

#### General Skill

(KU01) Being able to develop logical, critical, systematic, and creative thinking through scientific research, the creation of designs or works of art in the field of science and technology which concerns and applies the humanities value in accordance with their field of expertise, prepares scientific conception and result of study based on rules, procedures and scientific ethics in the form of a thesis or other equivalent form, and uploaded on a college page, as well as papers published in scientific journals accredited or accepted in international journals.

#### Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.  
 (S12) Working together to be able to make the most of his/her potential.

### Course Learning Outcomes

#### Knowledge

Mastering the modeling of power system device into mathematical equations and transient stability analysis using direct and indirect methods.

#### Specific Skill

Able to analyze transient stability and calculate critical clearance time (CCT) and its application to power system.

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**General Skill**

Able to use Matlab / Simulink and / or ETAP software to visualize and workout the concept of CCT calculation and its application to power system.

**Attitude**

Shows a responsible attitude towards the work in the field expertise independently.

Work together to be able to make the most of it potential possessed.

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**Main Subjects**

1. Definition and classification of power system stability
2. Generator modelling, exciter and governor
3. The same area method and development for multi machine
4. Time Domain Simulation Method
5. Energy Function Method
6. Critical Trajectory Method

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**Reference(s)**

- [1] Hsiao-Dong Chiang, "Direct Methods for Stability Analysis of Electric Power Systems: Theoretical Foundation, BCU Methodologies, and Applications", John Wiley and Son Inc., 2010
- [2] P.M. Anderson and A.A. Fouad, "Power System Control and Stability", IEEE Press Series on Power Engineering Second Edition, 2003
- [3] Prabha Kundur, "Power System Stability and Control", McGraw-Hill Inc. 2004
- [4] Ardyono Priyadi, Naoto Yorino and Mauridhi Hery Purnomo, "Critical Trajectory for Transient Stability", JTE-ITS Press 2012
- [5] Mania Pavella, Damien Ernst, and Daniel Ruiz-Vega, "Transient Stability of Power Systems A Unified Approach to Assessment and Control", Kluwer 2000

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**Prerequisite(s)**

Power System Analysis

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