COURSE SYLLABUS

EG2110 Power System Stability and Control (7.5 credits)

VT21

This course deals with advanced methods for analysis of power system dynamic, stability and control. Different power system instabilities will be presented and discussed. Furthermore, different control algorithms for improving power system stability will be presented.

Intended Learning Outcomes (ILOs)

In order to successfully complete this course, students should be able to:

ILO1. create mathematical models for describing power system dynamics,

ILO2. based on the derived mathematical models, apply different basic methods to

    a) study and analyze the basic concept of the presented types of power system instabilities,

    b) improve power system stability based on basic control algorithms,

ILO3. numerically perform ILO2 by using MATLAB, and present and discuss obtained numerical results.

Prerequisites	Language
Load flow calculations and basic control theory	English

Course structure

The course includes lectures, project work hours, and examination. During the project work hours, the teaching assistants will be available to assist the students with the assignments. Please n**ote that teaching assistants will only be available during the project work hours.**

Course staff

Course coordinator and teaching assistant	Lecturer and examiner:
Angel Clark	Mehrdad Ghandhari
angcla@kth.se	mehrdad@kth.se
Teaching assistant:	
Stefan Stankovic	
stanko@kth.se	

Disability

If you have a disability, you may receive support from Funka, KTH's coordinator for students with disabilities, see https://www.kth.se/en/student/studentliv/funktionsnedsattning.

Please inform the course coordinator if you have special needs not related to the written exam, and show your certificate from Funka.

- Support measures under code R (i.e. adjustments related to space, time, and physical circumstances) are generally granted by the examiner.

- Support measures under code P (pedagogical measures) may be granted or rejected by the examiner, after you have applied for this in accordance with KTH rules. Normally, support measures under code P will be granted.

Course literature

The course literature consists of the following two compendia which are available in Canvas.

- Stability of Power Systems, An introduction
- Power System Stability and Control, Exercises

Canvas

Canvas is an electronic communication platform that we use in the course, where you can find copies of lecture slides, projects, schedule, MATLAB files, etc. Canvas is also the platform where you electronically upload/submit your reports.

B-number

A unique identification number, called **B-number**, will be given to each student. This B-number will be used as your identification in this course. In order to get a B-number, you have to be first registered for the course. You receive your **B-number** by sending an email to eg2110@ee.kth.se. Write B-number in the "subject" of your email, and your name and your KTH email address in the body of your message.

Examination

The course examination consists of the following

E1. Four assignments namely, D1, D2, D3 and D4 which will be presented in a written report, respectively. Each report must be submitted in Canvas by the given deadline.

E2. A scheduled oral presentation (OP) of one of the passed reports. Only D1, D2 and D4 are considered for the oral presentation. The course staff select the report to be presented.

Please note that

- after submission of the reports or directly after the oral presentation, the course staff may ask for an individual oral explanation (OE) of the solutions in the passed reports. Therefore, the obtained grades in **E1** must be considered as preliminary since an unsatisfactory (or failed) OE will result in a change of the obtained grade for the corresponding report (or failing the corresponding report).

- reports which have not been submitted on time will be considered as failed,

- not attending the OP at the scheduled time will be considered as a failed OP,

- not attending the OE (if asked) will be considered as a failed OE.

Grading criteria

The grades used for assessing the criteria are

- **P/F** for D3 & OP,
- **0, 1, 3 and 5p.** for D1, D2 and D4.

The following criteria will be applied to the written reports and the oral presentation.

OP	
Grade **P**:	• The requirements for oral presentation are met, with a few insignificant errors.
Grade **F**:	• If the conditions for grade **P** are not met.

D3	
Grade **P**:	• The requirements for written report are met, with a few insignificant errors. • Solutions show a basic understanding of the assignment topic. • Some incorrect solutions.
Grade **F**:	• If the conditions for grade **P** are not met.

D1,D2&D4	
0 p.	• If the conditions for **1, 3 or 5 p.** are not met.
1 p.	• The requirements for written report are met, with a few insignificant errors. • Solutions show a basic understanding of the assignment topic. • Some incorrect solutions.
3 p.	• The same as for earning **1 p.**, but • solutions show a good understanding of the assignment topic, • only a few insignificant incorrect solutions.
5 p.	• The same as for earning **3 p.**, but • the answers are well motivated, • no incorrect solutions.

Final grade

In order to successfully complete this course and to earn 7.5 credits, the following necessary requirements (NR) must be fulfilled.

NR1. You have passed D3 and you have earned at least **1 p.** from D1, D2 and D4, respectively.

NR2. You have passed the oral presentation.

NR3. The necessary requirements **NR1** and **NR2** are met during the current academic year, i.e. passed oral presentation or reports from previous academic years will not be accepted.

The table below shows the course final passing grades providing that **NR1-NR3** are met. The points are based on the total earned points from D1, D2 and D4.

Total earned points	Grade
15	**A**
11 or 13	**B**
9	**C**
5 or 7	**D**
3	**E**

Plagiarism

All the reports will be checked for plagiarism, and if the plagiarism of text, code, or figures is found then strict action will be taken against the corresponding student, based on KTH rules.

- KTH defines plagiarism as "submitting someone else's work as your own". Thus, it can be considered as plagiarism if to use - either directly or slightly modified - a text, program code, table or figure that you have not created yourself.

- Plagiarism will be considered as a "learning error" if there is no reason to suspect an attempt to deceive; in this case the student will simply fail the assignment. However, any case where there is a suspicion that the plagiarism was intentional will be reported to the President of KTH and may be examined by the disciplinary board. The written assignment is to be written individually and all reports will automatically be checked for plagiarism.

- You may not use texts, program codes, tables or figures written by another student as a basis for your own work, and submit a similar or slightly modified solution. This also means that you are not allowed to hand over your solution to another student to use as a basis for the report.

- You are allowed to cite and use ideas from the course literature, other textbooks and scientific papers. However, in these cases there must be a clear reference to the source.