



COURSE SYLLABUS

EG2100 Power System Analysis (6 credits)

HT21

This course deals with basic models and methods that are used in static analysis of electric power systems. These models and methods are fairly general and can be applied to a power system of any scale ranging from a small-scale distribution grid to a national transmission network.

Intended Learning Outcomes (ILOs)

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

ILO1. create mathematical models based on which to analyze and perform calculations

- a) under symmetrical conditions,
- b) under unsymmetrical conditions,
- c) for load flow.

ILO2. numerically perform ILO1 by using MATLAB, and present and discuss obtained numerical results.

Prerequisites	Follow up	Language
<ul style="list-style-type: none">• SF1624 Algebra and geometry (or equivalent)• SF1625 Calculus in one variable (or equivalent)• SF1626 Calculus in several variables (or equivalent)• SF1519 Numerical methods and basic programming or• SF1546 Numerical methods, basic course or• EL1150 Introductory Matlab course (or equivalent)• EJ1200 Electric power systems (or equivalent)	EG2110 Power System Stability and Control	English

Course structure

The course includes lectures, project work hours, and examination. During the project work hours, the teaching assistants will be available in **the class room** to assist the students with the projects. **Note that teaching assistants will only be available during the project work hours.**

Course staff

Course examiner and course responsible:	Lecturers:
Qianwen Xu qianwenx@kth.se phone: 08- 790 63 56	Lennart Söder lennart.soder@ee.kth.se phone: 08-790 8906
	Qianwen Xu qianwenx@kth.se phone: 08- 790 63 56

Teaching assistants:
Saeed Mohammadi saeedmoh@kth.se
Umbereen Sayyeda sayyeda@kth.se
Yizhou Lu

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

Lennart Söder & Mehrdad Ghandhari, *"Static Analysis of Power System"*, available in Canvas.

Canvas

Canvas is an electronic communication platform we use in the course where you find course literature, lecture slides, assignments, schedule, etc. Canvas is also the platform where you electronically submit (upload) your reports.

Examination and completion

- **Rating scale**

A, B, C, D, E, FX, F

- **Examination**

The course examination consists of

- a project with four assignments, namely **S1**, **S2**, **S3** and **LF** which are presented in a written report, respectively, and
- an individual oral explanation (**OE**). The **OE** can be performed only if all assignments have been passed. During the **OE**, the course staff will go through your reports and ask you to explain/motivate your answers in the reports. **No PowerPoint presentation is required.**

A unique identification number, called **A-number**, will be given to each student. This **A-number** will be used in the assignments.

You receive your **A-number** by sending an email to qianwenx@kth.se. Write 'A-number' in the subject of your email, and **your name, your personal number and your email address** in the body of your message.

The A-numbers will be sent only to students who have been registered for the course.

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

- **Ethical approach**

- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution

- **Goal-related grading criteria / assessment criteria**

The table below shows mapping of ILOs to the course assessment.

	S1	S2	S3	LF
ILO1 a)	X	X		
ILO1 b)			X	
ILO1 c)				X
ILO2	X	X	X	X

- **Examination details**

The grades used for assessing the criteria are

- **P/F** for **S1** and **OE**,
- **0 p.**, **1 p.**, **3 p.** and **5 p.** for **S2**, **S3** and **LF**.

For grade **P**, the following criteria will be applied to **S1** and **OE**.

- **S1:** if
 - the given instructions for the assignments are fully followed,
 - all introduced variables and quantities are clearly defined,
 - correct answers to some parts of the questions are given.
- **OE:** if the oral explanations demonstrate the ability to meet ILO1.

For **S2**, **S3** and **LF**, the following grading criteria will be applied, respectively.

	1 p.	3 p.	5 p.	0 p.
S2 S3 LF	<ul style="list-style-type: none"> • Solutions demonstrate a sufficient ability to meet ILO1. • Introduced variables and quantities are clearly defined. • Correct answers to some parts of the question. • The given instructions for the assignments are fully followed. 	<ul style="list-style-type: none"> • Solutions demonstrate the ability to meet ILO1. • Introduced variables and quantities are clearly defined. • Correct answers to the most part of the question. • The given instructions for the assignments are fully followed. 	<ul style="list-style-type: none"> • Solutions demonstrate the ability to meet ILO1. • Introduced variables and quantities are clearly defined, and the answers are well motivated. • Correct answers to all parts of the question. • The given instructions for the assignments are fully followed. 	If at least 1 p. is not earned

In order to successfully complete the course (6 cr.), the following necessary requirements (**NR**) must be met:

NR1. Grade **P** for **S1**.

NR2. At least **1 p.** for **S2**, **S3** and **LF**, respectively.

NR3. Grade **P** for **OE**. The **OE** can be performed if only **NR1** & **NR 2** are met.

The table below shows the course final passing grades **A-E** based on the earned points from **S2**, **S3** and **LF**.

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

The grade of **F** will be assigned to students who have not fulfilled all necessary requirements (NR).

Opportunity to complete the requirements via supplementary examination (FX)

If **NR1** is met, but not **NR2** for **only one** assignment (i.e. S2, S3 or LF, **one of them is 0 p**), the student will then be offered a new opportunity to revise the failed report and to resubmit it to Canvas **by Jan 8, 2022**. Once the resubmitted report is passed, the student will only earn **1 p.** for the resubmitted report.

If the resubmitted report is not passed, the ordinary **OE** cannot be performed and the report can be again revised and resubmitted for re-examination.

Re-examination

This is the last opportunity during this academic year for being able to fulfil all necessary requirements (NR) to successfully complete the course. Thus, the following reports can be submitted to Canvas by **March 15, 2022**.

- The already submitted failed reports. Once the reports are passed, the student will only earn **1 p.** for each passed report.
- The reports which were not submitted on the ordinary given dates. For the passed reports, the grading criteria will be applied.

Furthermore, those who did not attend (or failed) the ordinary **OE** can perform it (providing that **NR1 & NR 2** are met) on the scheduled date for re-**OE** in April.

Plagiarism

All the submitted reports will be checked for plagiarism, and if the plagiarism of code, texts or figures is found then strict action will be taken against the corresponding student, based on KTH rules. It is of utmost important to know that the rules at KTH related to plagiarism are quite strict.

- *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.*
- *It is strongly recommended to read the information on*

<https://www.kth.se/en/student/studentliv/studentratt/disciplinamnden-och-disciplinara-atgarder/disciplinarenden-1.324323>