KTH ROYAL INSTITUTE
OF TECHNOLOGY

Kandidatexjobb (kexjobb), DA150x

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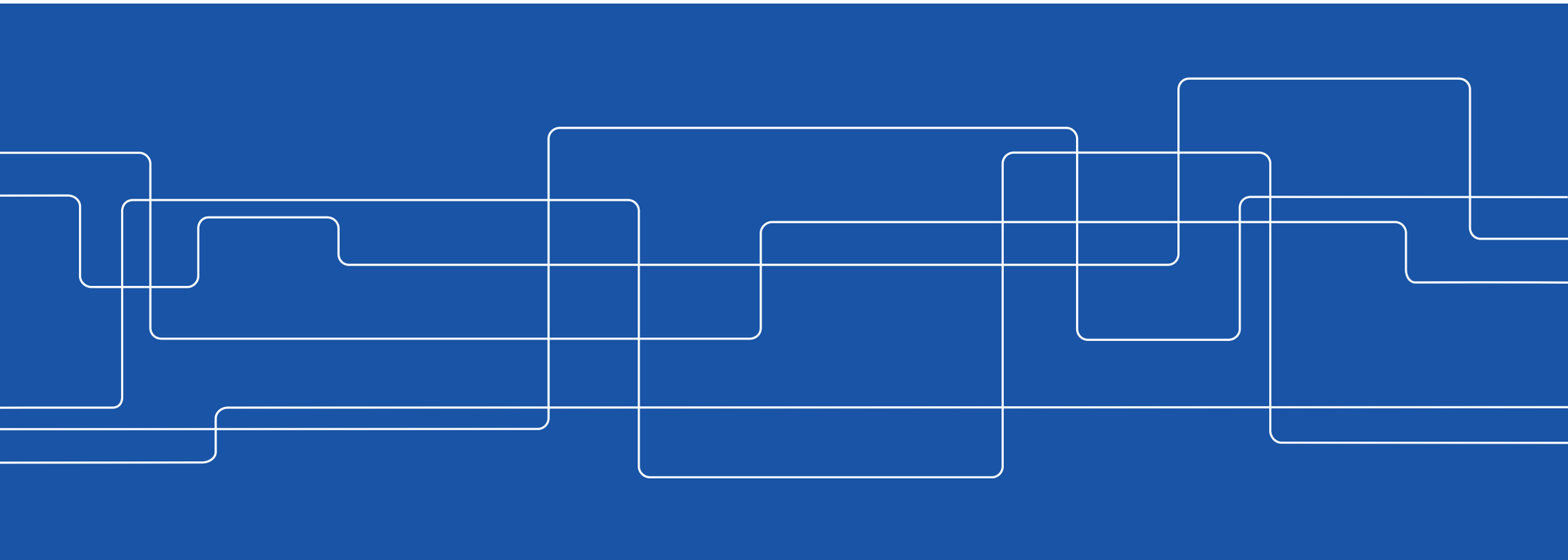
Jörg Conradt



Outline

1. Aim (mål)
2. Mandatory components (obligatoriska delar)
3. Implementation, project execution (genomförande)
4. The report (rapporten)

Aim (mål)

What is kandidatexjobb?

- Independent work (självständigt arbete)
  - Your own responsibility, define yourselves what you should work on (*under eget ansvar*)
  - Not individual (in pairs) and not without supervision (*inte individuellt eller utan handledning*)
  - You plan and conduct your research study independently (*självständigt planera och utföra en undersökning*)

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  - You produce research/academic results (*det akademiska resultatet*)
  - Develop skills, acquire knowledge that you need (*skaffa de kunskaper som behövs, tillämpa färdigheter*)

Aim (mål)

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- Independent work (självständigt arbete)

Kursmålen

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  - Develop skills, acquire knowledge that you need (*skaffa de kunskaper som behövs, tillämpa färdigheter*)
  - Critically discuss your own as well as your peers' work – scientific results (*kritiskt diskutera egna och andras vetenskapliga resultat*)
  - Present your work in writing and orally (*presentera arbetet, muntligt och skriftligt, med krav på struktur och innehåll*)

Aim (mål)

What is kandidatexjobb?

- Independent work *(självständigt arbete)*
- Scientific nature and setup of your work *(vetenskapligt upplagd studie)*
  - Focus on the report (*fokus på rapporten*)
  - Clear problem formulation, research question (*tydlig frågeställning*)
  - Programming, implementation is only a tool, not the objective *(bara ett verktyg på vägen)*
  - The need for a literature study, related work, state of the art (*litteratursökning nödvändig*)
  - Advised NOT to seek a project at a company (*rekommenderas att INTE leta arbete hos företag*)

Aim (mål)

What is kandidatexjobb?

- Independent work *(självständigt arbete)*
- Scientific nature and setup of your work *(vetenskapligt upplagd studie)*
- Fixed deadlines *(fast slutdatum)*

Mandatory tasks (obligatoriska delar)

- Project plan (*projektplan*)
  - written specification with a clear problem statement and a workplan/schedule
- Report (*rapport*)
  - must fulfill the requirements for a scientific/academic report
- Popular science description (*populärvetenskaplig text*)
  - should inform general (non-academic) audience about your research and the area
- Presentation (*presentation*)
  - must fulfill the requirements for a presentation at a scientific conference
- Peer review (*kritisk granskning*)
  - both in writing and oral during the conference

Formulating a research question (frågeställning)

- Tricky part
  - Needs a discussion with the supervisor but your autonomous choice
  - Should be built on previous work (usually reported in the literature)
  - Relevant to the field, providing scope for new knowledge, generalisable (NOT necessarily a solution, rather an *answer to an interesting question*)

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- Good examples available in the past reports
- Bad examples
  - Open-ended questions with no scope for a conclusive answer
    - Is it possible to…/ Can one….? etc. – NOT recommended!
  - Questions that invite unfocused, purely exploratory studies
    - How can one …? – NOT recommended!

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  - Should be built on previous work (usually reported in the literature)
  - Relevant to the field, providing scope for new knowledge, generalisable (not necessarily a solution, rather an answer to an interesting question)
- Good examples available in the past reports
- Bad examples
- Process helping you to arrive at a suitable research question
  - Discussion with a supervisor and an iterative re-formulation
  - Attend a lecture/seminar on problem formulation, project planning
  - Reading relevant literature, reflecting on what is interesting, what the gaps in knowledge are and where you can contribute

Report (rapporten)

Structure (*struktur*)

1. **Introduction** – a wider context, basic background, brief overview of the state of the art, motivation, Scope, Aims, Research question/Problem Statement
2. **Background**
3. **Methods**
4. **Results**
5. **Discussion**
6. **Conclusions**

Report (rapporten)

Structure (*struktur*)

1. **Introduction**
2. **Background** – extended background, fundamentals, Related Work (detailed literature review, state of the art)
3. **Methods**
4. **Results**
5. **Discussion**
6. **Conclusions**

Report (rapporten)

Structure (*struktur*)

1. **Introduction**
2. **Background**
3. **Methods** – your *tools* used to address the research question, *motivated* method selection, description of your experiments, data, evaluation etc. (what is needed to reproduce your study)
4. **Results**
5. **Discussion**
6. **Conclusions**

Report (rapporten)

Structure (*struktur*)

1. **Introduction**
2. **Background**
3. **Methods**
4. **Results** – *a story* where you present what you have achieved, illustrated with tables, figures; objective outcomes, suitable analyses to demonstrate findings relevant to the study
5. **Discussion**
6. **Conclusions**

Report (rapporten)

Structure (*struktur*)

1. **Introduction**
2. **Background**
3. **Methods**
4. **Results**
5. **Discussion** – brief summary of the key findings and subjective, reflective analysis of the results from a broader perspective: critical evaluation, analysis of limitations, strengths & weaknesses; impact, relevance to the field/state of the art; ethical and sustainability considerations
6. **Conclusions**

Report (rapporten)

Structure (*struktur*)

1. **Introduction**
2. **Background**
3. **Methods**
4. **Results**
5. **Discussion**
6. **Conclusions** – answer(s) to the research question(s), main results, closing remarks (*future work*)

Report requirements (krav på rapporten)

- **Title and abstract** (titel och sammanfattning)
  - Title clearly describes your study
  - Abstract/summary reflects the content of the report
- **Introduction** (Inledning)
  - Research question is easy to identify, project aims, purpose and scope are clear
  - The problem (and students' contribution) is clearly delimited and its relevance is motivated and put in a context
- **Background** (Bakgrund)
  - Students demonstrate knowledge in the field and familiarity with previous work (state of the art, relevant and significant literature)
  - The background is coherent, relevant and not excessive

Report requirements (krav på rapporten)

- **Methods** (Metoder)
  - Selection of methods is well motivated, their use is correct
  - Methods are well documented with suitable references
  - Focus on how methods are used, how the study is designed, evaluated
- **Results** (Resultat – objektiva observationer)
  - Results are structured in a coherent and logical way
  - The storyline is supported with clear illustrations, tables etc.
  - Suitable analysis is conducted in a correct way (technical soundness)
- **Discussion and Conclusions** (Diskussion och slutsatser)
  - The most important findings are emphasized and briefly summarized
  - They are critically evaluated given the limitations and assumptions, links to the state of the art and their impact on the field
  - Conclusions are reasonable, relevant, concrete and address the research question

General characteristics of the report (generella egenskaper)

- The report should be coherent and focused on the problem – the project aims should be reached and the content should support your research investigation (test hypothesis) avoiding irrelevant detours
- Presentation style (academic) has to be suitable for the target group – your peers
- Tables, diagrams, illustrations used in the report should be clear, have informative captions and each must be referred to in the text
- The content must be well structured and the linguistic form (language) should fulfill academic standards (incl. correct grammar, spelling etc.)

Timeline (tidslinje)

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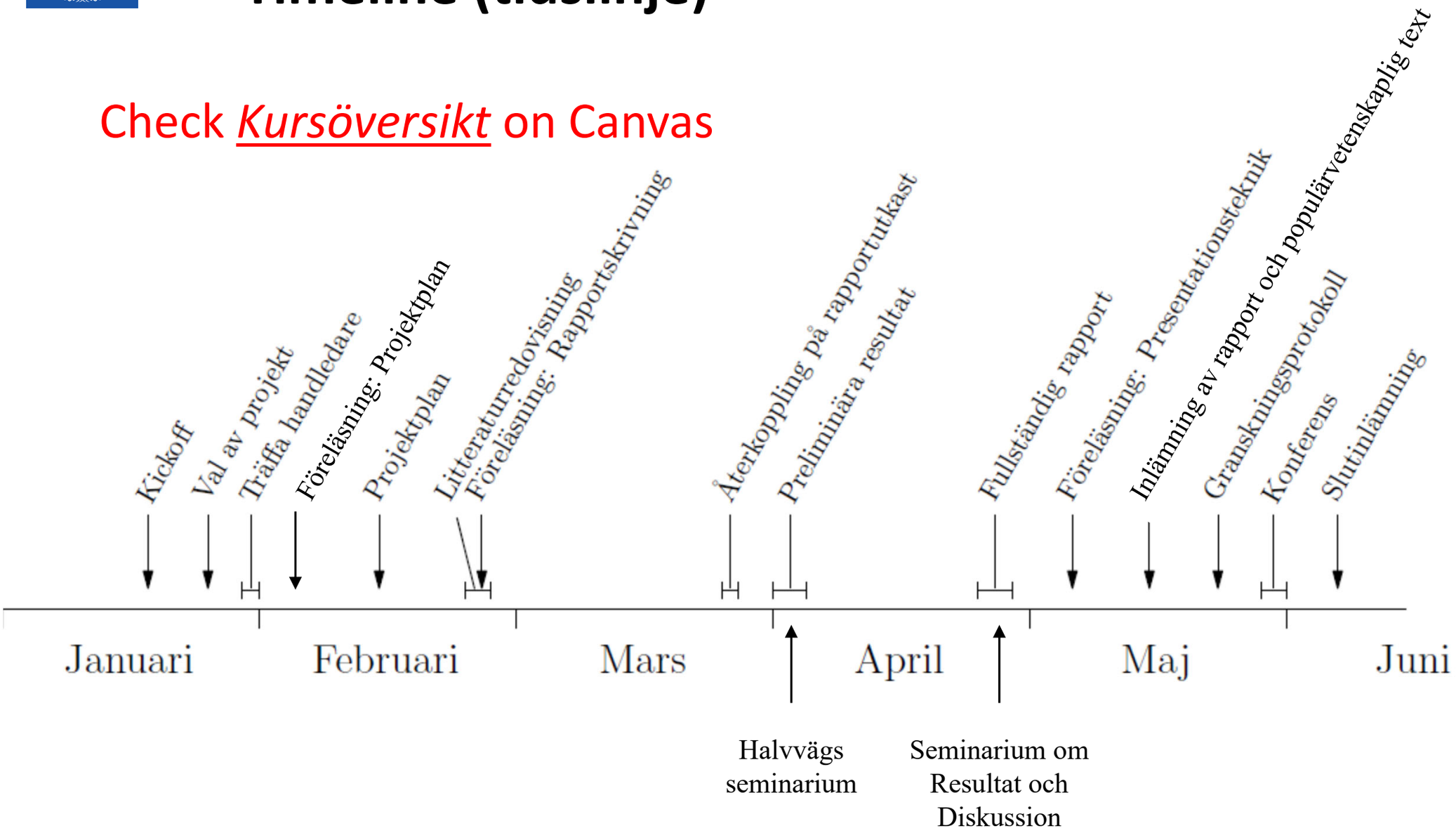
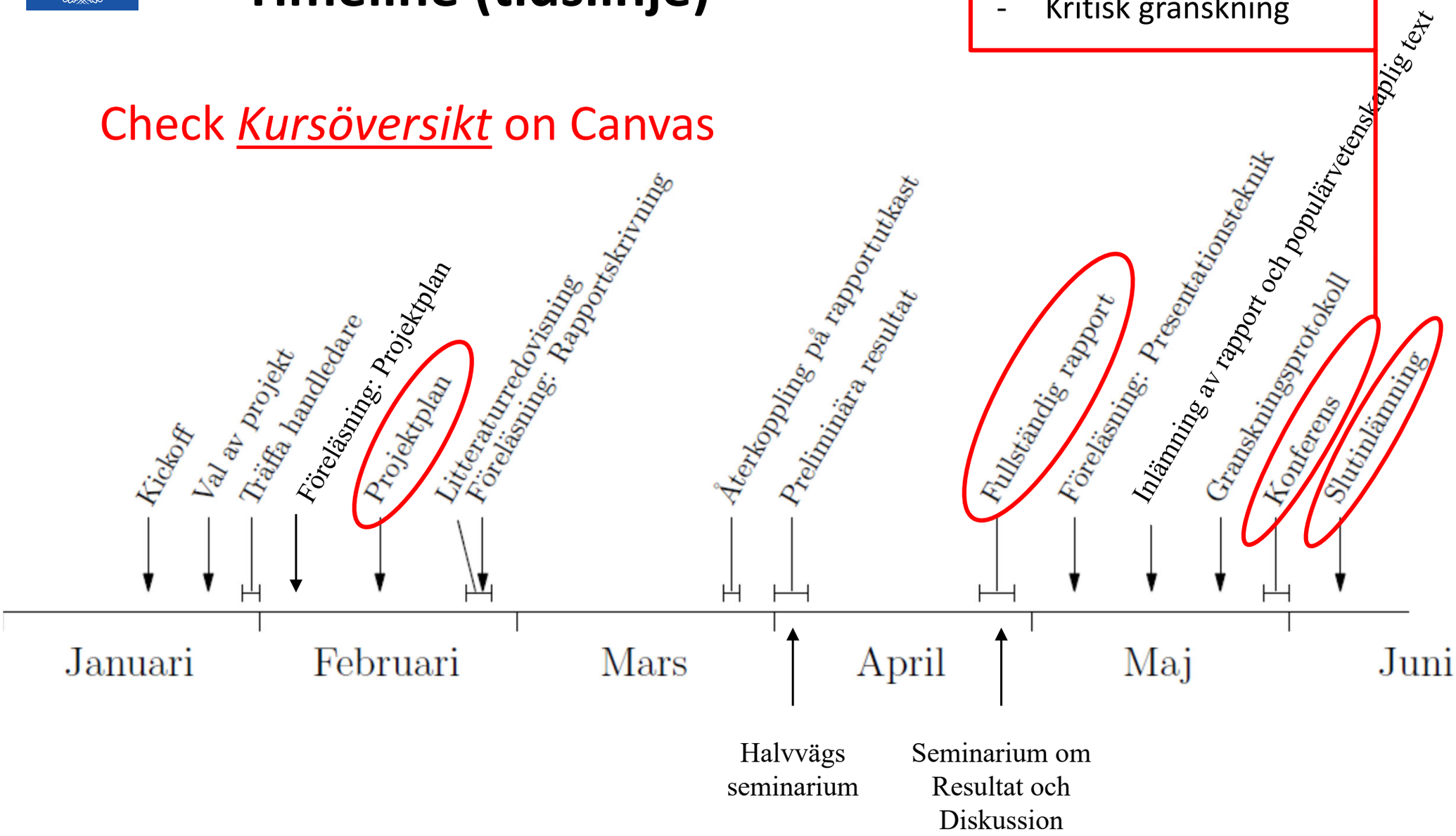


Timeline (tidslinje)

- Muntlig presentation
- Kritisk granskning

Check *Kursöversikt* on Canvas

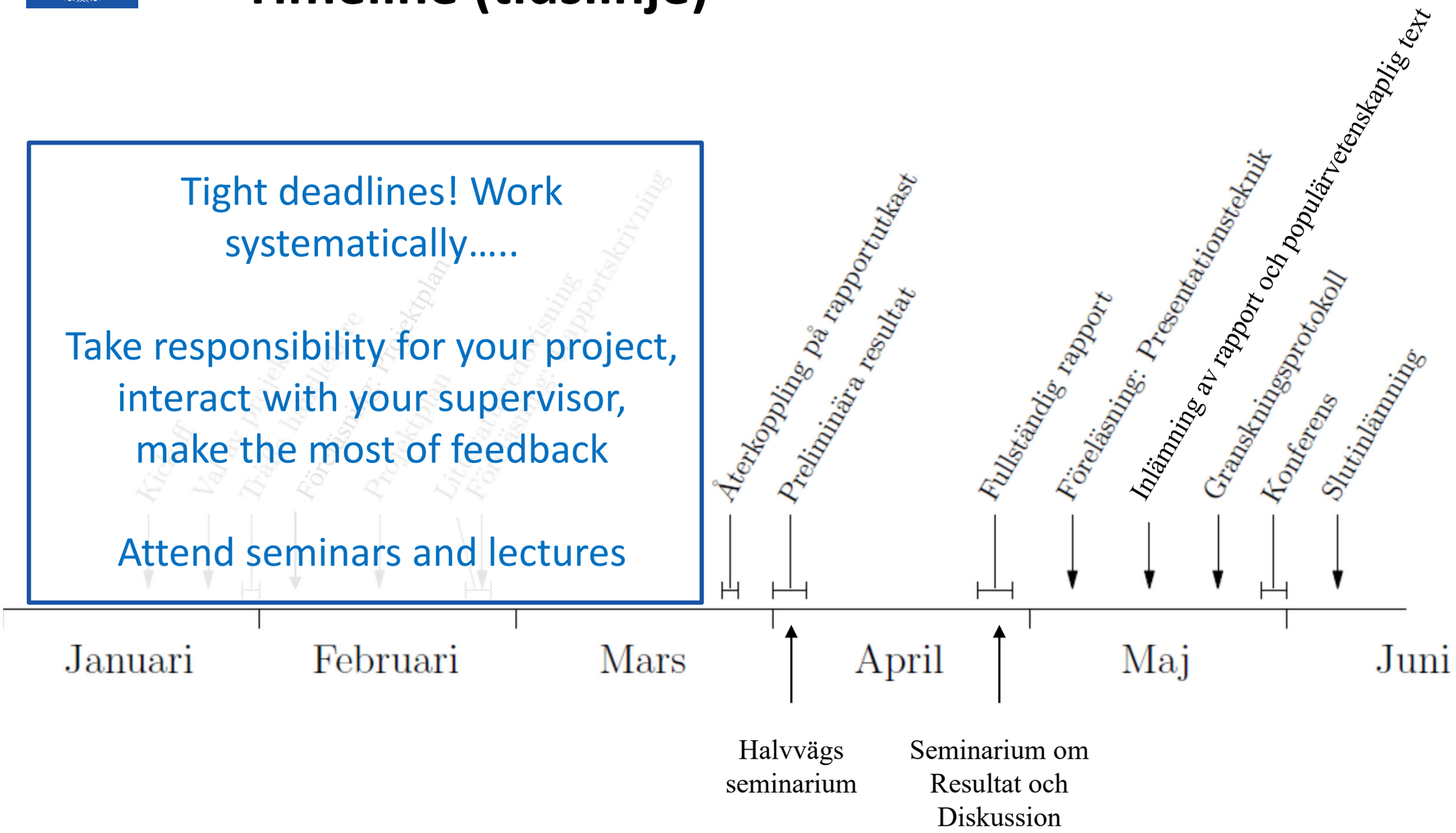


Timeline (tidslinje)

Tight deadlines! Work systematically…..

Take responsibility for your project, interact with your supervisor, make the most of feedback

Attend seminars and lectures



Resources (resurser)

- Supervisors and course responsible, examiner (*handledare, kursansvarig, examinator*) – their different roles
- Canvas course webpage and KTH social (*kurswebben*)
  - **general** announcements, discussions (*meddelanden*)
  - information webpages, forms, templates, evaluation checklists
- Literature (KTH library, Google Scholar, Scopus etc.) and previous body of work, theses at KTH (Diva)
- Language and Communication at KTH (*Språk och Kommunikation*)

Next steps (nästa steg) ……

- Form groups of two
- Choose/formulate project and notify Jörg via email (see details under *Uppgifter / Skicka projektpreferenser*)
- Meet you supervisor and discuss the scope
- Attend a lecture/seminar on writing a project plan and problem formulation
- Do a lot of reading!
- Write your project specification draft (with your research question and time plan/Gantt chart) and discuss it with your supervisor (iterative process!)
- Submit the final version of the specification to Canvas
- Continue your literature review, start working on your first experiments
- Do not forget about the report and enjoy the experience as a researcher!