UNIVERSITY OF OSLO

Research report

TEK5410 Examination

10th September 2025

Contents

Background

In TEK5410, we operate with a portfolio assessment and an oral exam, which together make up the final grade. The portfolio consists of assignments and a research report (3000 words). The portfolio assignments and the research report must be passed before you can sit the final oral exam.

The research report is based on an energy systems analysis you conduct by the use of an energy system model.

- Deadline: 3 December 23:59:59
- Oral examination: 10 December
  - You present your report and project

Contents

Project overview

The design of your project is relatively open for you to define. You must however:

- define a clear and relevant research question (assignment 4)
- analyse the future energy system of one or several countries/regions
- utilise the tools we've taught in the course
  - model written in GAMS (extend what we have already worked with)
  - analysis *mostly* done in Python

Project overview

- The project includes identifying relevant data,
- pre-processing it for use in GAMS,
- developing and applying a model to answer your research question,
- post-processing of the model results,
- presenting the results in a clear and coherent way

Please discuss your research idea with us, the teachers, and we can provide you with input if it is inside/outside the scope of the course and how difficult it might be.

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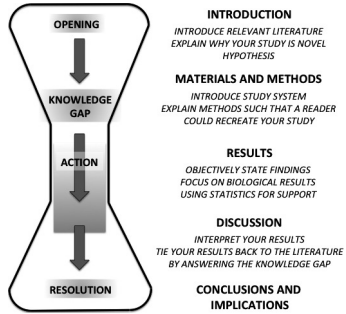
IMRaD format

We ask you to structure your report according to the **IMRaD format**

Scientific Writing Made Easy: A Step-by-Step Guide to Undergraduate Writing in the Biological Sciences



Bulletin Ecologic Soc America, Volume: 97, Issue: 4, Pages: 417-426, First published: 03 October 2016, DOI: (10.1002/bes2.1258)

Report structure

- Introduction
  - Introduce the context of your project.
  - What are you going to study in your project and why?
- Methodology
  - Research question
  - How did you conduct your project? What data did you use, how did you curate it? Explain your model.
  - Mathematical formulations can be very useful. Including pure code is not.

Report structure

- Results
  - What results did the model produce?
- Discussion
  - Discuss insights from your results. What do they indicate? What was the answer to your research question?
  - Conclusion
  - Are there any limitations to, for example, your method or data?
  - What should future research focus on?

Scientific writing and referencing

- Write defensively (i.e. only claim what you can prove)
- Support your claims with references.
- Use author-date format and APA 7th Edition
- Using a reference manager helps a lot.
  - https://www.ub.uio.no/english/writing-publishing/referencing/zotero/
  - Zotero can do "everything" for you.
- Using active voice is OK.

Further reading

See section 5 in general and table 10 in particular in the following paper:

Sovacool, B. K., Axsen, J., & Sorrell, S. (2018). Promoting novelty, rigor, and style in energy social science: Towards codes of practice for appropriate methods and research design. Energy Research & Social Science, 45, 12–42. **https://doi.org/10.1016/j.erss.2018.07.007**

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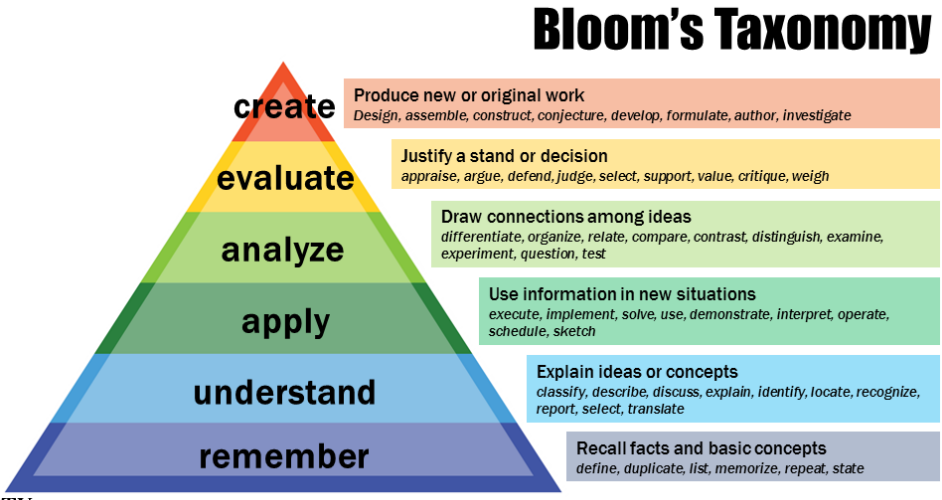
Assessment framework



Assessment framework

We can relate the action verbs in Bloom's taxonomy to the learning outcomes of the course, where the higher levels of the triangle correspond to a better understanding of the course content, and as such results in a higher grade.

For example, for the learning outcome "*[you] are able to build your own electricity system model in GAMS and conduct the analysis*", re-using the same model that we've developed during the lectures only points toward that you are able to recall facts and basic concepts, indicating a lower grade. On the other hand, if you show that you understand the concepts, are able to apply them in other situations and even design new features, you are very likely to reach a higher grade.

Research report
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2. Project overview
3. Report structure
4. Evaluation