Guide to register research education courses in the LTH course database (FUD)

This document is aimed for department level research education study directors as well as research education leaders at LTH. It explains what needs to be included, and why, in order for a research education subject to register a research education course in the course database FUD. It also explains the review process and communication that takes place before a course is published in FUD.

When a teacher at LTH wants to register a course in FUD the application should be coordinated with the study director of the research education subject. The five research education leaders in the LTH research education board prepares a decision and provide any feedback on the application before a decision is made by the research education board.

Research education courses should have detailed course plans according to Lund University and LTH guidelines [1, 2]. This is aligned with the Bologna process where research education constitutes the third and highest level of education in the EU. The underlying thought is that concrete and explicit learning outcomes and course aims that are understood by the PhD students before applying for and taking the course should facilitate both local, regional, and global mobility for PhD students when they search for and need to take courses. Based on the course plans, the PhD students should, as far as possible, understand why the course is offered (aim), what the course is about (contents), what performance is required (fulfilled learning outcomes) and what is required to be eligible to apply for the course (prerequisites), etc.

Below are sections about:
- **Information that must be included in a course plan in FUD**
- **How to formulate the aim of a course**
- **How to formulate the learning outcomes**
- **How to reason about the education level of a course**
- **The process of applying for a course to be included in FUD**

The following information is enteredin FUD by the course owner:
- Course aim (in Swedish and English. Why is the course offered?)
- Learning outcomes of the course (in Swedish and English. What does the PhD student have to deliver and know in order to pass the course?)
- Course name (in Swedish and English)
- Course credits in hp (half credits are allowed)
- Course level (research education only, or including MSc level)
- Course language (Swedish or English)
- Course contents (subject related)
- Course literature
- Forms of education that will be applied
- Forms of assessment and requirements for passing the course
- Grading scale
- Admission criteria and priority
- Prerequisites (if applicable)
- Other information (e.g., course leader)
- Course home page (if applicable)
- Course code (temporary and permanent code as well as start date are assigned by FUD)

The items adhere to the requirements decided for research education courses by Lund University and LTH [1, 2]. Most of them are self-explanatory. Some clarifications are included below pertaining to some common stumbling points: stating the aim, the learning outcomes and the level classification.

To formulate the aim of the course

The word "aim" is somewhat arbitrary but in this context it's appropriate to have the student's perspective and needs in mind and try to answer the question: "why does this course exist?" The answer probably relates to the role of the course in the student's progression towards the degree as well as its importance for the student beyond the degree. A made-up example:

Aim: The course aims for the PhD student to understand the principles of electron-microscopy and to be able to use the x-department's different types of scanning electron microscopes in his/her research.

To formulate and categorize learning outcomes

According to the underlying principles of the Bologna process a course should have a handful of formulated learning outcomes, that in turn fall into the three categories: "*knowledge & understanding*", "*competences & skills*" and "*judgement & approach*". It's not necessary for the course to have formulated learning outcomes in all three categories, but a base requirement at LTH is that each course has at least one learning outcome relating to knowledge & understanding. The categorization follows the subdivision of degree outcomes specified in the higher education ordinance but can be construed as somewhat artificial in cases when knowledge & understanding and competences & skills are naturally intertwined in the teaching. A learning outcome can then "happen" to fall under more than one category and a reasonable, although somewhat arbitrary, decision must be made about which one to choose. Learning outcomes should be viewed as an

assessment threshold that all passing students fulfill, not just a strive. Dissecting one of the handful of learning outcomes defined by a course, it should illuminate three aspects:

–   What the PhD student should learn (also present under "Contents")
–   What, concretely, the PhD student should be able to do after the course (something that can be assessed)
–   The quality/limitation of what the PhD student is expected to do (How well should it be mastered? How independently? Under what circumstances?)

Below are some color-coded examples from the three categories:

Knowledge & understanding
To pass the course the PhD student should
–   show understanding of the back-scatter detector functions that are relevant for the analyses included in the PhD student's research.

Competences & skills
To pass the course the PhD student should
–   independently be able to perform element mapping and chemical traverses using the electron microscope EDX and cathode luminescence functions.

Judgement & approach
To pass the course the PhD student should
–   show a critical approach to collected analysis data and consider both potential error sources and systematic errors in sample selections made by the PhD student and by other course participants.

Using the simple principles above it should be possible to formulate and register a course plan that will be approved for inclusion in FUD. If you want to further understand the background for how to actively mark the difference in level between courses on basic, advanced and research education level you can keep reading below.

How advanced is the learning outcome? Which education level is the course at?

What the PhD student should be able to perform in the course is often described with verbs at different levels in the SOLO taxonomy [3]. This is one of the dimensions describing learning outcome complexity (**Fig. 1**). Courses contain a mix of learning outcomes with a center of gravity high or low on the SOLO staircase.
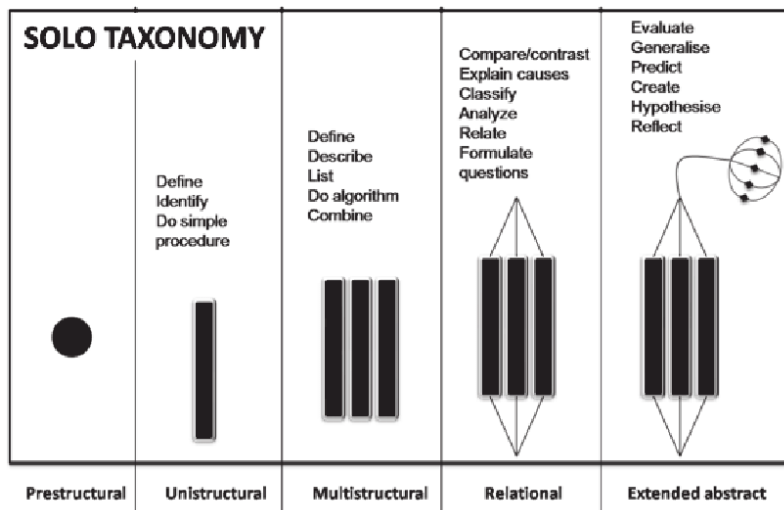
Fig. 1: The SOLO taxonomy.

Another dimension is based on the complexity of the course contents. This can also indicate how advanced a learning outcome is. A learning outcome can be advanced due to depth of knowledge, width of knowledge, competences or subject complexity.

Depth of knowledge – "division staircase" vs. "Schrödinger equation"
Width of knowledge – "circulatory system" vs. "mass flow in plants, algae and animals"
Skills – "take blood sample" vs. "perform bypass surgery"
Complexity – "role of nitrogen in over-fertilization" vs. "environmental problems in the Baltic region"

A third dimension to determine the level of a learning outcome is given by the quality required and the circumstances.

"Arranged" vs. "Open"
"Given" vs. "Self-defined circumstances"
"Reasoning" vs. "Research based"
"Based on your own research material" vs. "in all situations"

In the end it's the collected analysis by the research community / discipline of how advanced the learning outcomes are that determines whether the course deserves to be at the research education level (based on the three dimensions above). Additionally, there could be considerations as to how central/peripheral the course is for an educational program, which complicates the situation. E.g., we often encourage a PhD student in subject A to take an advanced master-level course in research education subject B. If the supervisor considers the course particularly peripheral, at low level or overlapping with other already fulfilled courses, the course can be included but render reduced credits. Such considerations should of course be negotiated beforehand and recorded in the individual study plan.

The most important role of the course plan is to formalize and communicate the course level and contents to the students, and to maintain this level in the planning of both teaching and assessment. This type of harmony in a course is called "constructive alignment".

References

[1] https://www.medarbetarwebben.lu.se/sites/medarbetarwebben.lu.se/files/foreskrifter-for-utbildning-pa-forskarniva-vid-lunds-universitet.pdf

[2] https://www.lth.se/fileadmin/lth/anstallda/regelverket_LTH/Riktlinjer_gaellande_forskarutbildning_vid_LTH-2021maj.pdf

[3] Biggs, J.B., 1999. What the student does: Teaching for quality learning at university. Buckingham: Open University Press.