# PhD Plan

The PhD plan is a **tool** for managing the progress and describing the contents of the PhD project. Its purpose is to ensure precise and customized **communication** between the student, the supervisor and the PhD administration. This tool can help the students and the supervisors formulate and concretize the elements in a research project. From the administration point of view the PhD plan is essential to evaluate if the proposed research can be realized within the framework of a PhD study. The student’s and supervisor’s 6 months’ evaluations must be based on the PhD plan.

A PhD plan is required by the legal regulations of PhD studies in Denmark and is therefore mandatory for all students. It is expected that the supervisors take an active part in the production of the plan. The PhD plan must be submitted no later than two months after the start of the studies.

After 10 months the PhD plan is updated according to the experiences gained during the beginning phase of the project. The resulting updated plan will be evaluated at a public 11 months’ status seminar. The 12 months’ plan must be further updated according to the feedback at the seminar and submitted within 12 months since the beginning of the PhD study. Further details regarding the 11 months’ status seminar can be found in a separate document at the Doctoral School’s homepage under Forms and Templates

https://www.phd.aau.dk/engineering-and-science/for-current-phd-students#forms-and-template

For PhD students enrolled in the 4+4 scheme, the 12 months’ plan must be submitted after one year’s full time PhD studies, i.e., in connection with the qualifying exam. The status seminar is held in connection with the qualifying exam.

The paradigm here is intended to help the students and supervisors consider the different elements of the PhD process. The paradigm is the same for both the 2 months’ plan and the 12 months’ plan, but it is expected that the 12 months’ plan is much more concrete and elaborated than the 2 months’ plan. The particular areas that you must pay attention to with regards to the 12 months’ plan are written in italic. The PhD plan should be specific and as short as possible while still containing the necessary information.

PhD students enrolled in the 4+4 scheme must pay special attention to the areas in the plan which call for elaboration concerning the finalization of the MSc education.

The PhD plan must be uploaded through the PhD manager portal found at the following address: [https://phdwebaau.sdu.dk](https://phdwebaau.sdu.dk/) (copy paste into your browser). Please use your AAU signon.

Please make sure that a proper scientific conduct is demonstrated throughout the PhD plan. For guidelines see <https://www.en.engineering.aau.dk/research/good-scientific-practice>.

# PARADIGM

# Section 1. Project summary/abstract

A short summary in layman’s terms describing key motivation, significance, methodology, and expected outcome of the PhD study. A reader of the local newspaper should be able to understand the summary.

*12 months: An updated version of the summary.*

# Section 2. The scientific content of the PhD project

**a.** **Background.** The background for the project problem should be described briefly.

**b. State-of-the-art.** An introduction stating the state-of-the-art for the PhD project. The introduction should include key references listed under section 10. Typically, at least 10-15 references to peer reviewed scientific material are expected. In case it is necessary to refer to non-peer reviewed material then use a footnote (or parenthesis) to provide information to the source.

*12 months: The state-of-the-art for the PhD project must be updated including use of the most essential references (list references under section 10).*

**c. Project objectives.** Statement of the project’s objectives followed by a formulation of the specific problem(s) addressed in the study. This could be formulated as a hypothesis and/or research questions. Explain the relevance of the present PhD project so the scientific contribution will be evident – i.e. explain how the project advances current state-of-the-art. Scientific challenges should be clearly defined – don’t mistake this for technological challenges.

*12 months: Update and clarify project objectives.*

**d.** **Key methods.**

Describe how the project objectives will be accomplished, i.e., investigate the stated hypotheses or research questions. For instance, will empirical methods be used and if so qualitative, observational or experimental? How will data be analysed, e.g., which statistical methods? Other examples of research methodology are mathematical deduction, simulation studies, …

*12 months: Update the key methods for the PhD project.*

**e.** **Significance and outcome.** Potential significance and application(s) of the project’s expected outcome, possibly including methodological contributions.

*12 months: Experiences and results obtained so far in the project followed by expected outcome of the entire PhD project.*

# Section 3. Work and publication plans

**a. Work and Time Plans.** Work and time plans including measurable milestones (project milestones and deadlines for expected publications for each six months period or finer). It is recommended that a number of sub-project activities are identified that can be associated with milestones, so that there are milestones (at least) each six months during the project. Remember to allocate time for preparing scientific publications (conference papers, journal papers etc.). Deadlines for the expected publications must be included. These milestones will allow the PhD student and supervisor(s) to assess the status of the project each six months and to revise the plan if needed. The specific activities described in the time plan must be of such detail that it is clear what should be carried out. A proposal for the layout of a time schedule is shown below. Assess the risk of not reaching the various milestones at the deadlines given. Provide precautions for milestones for which the completion of the associated task could be problematic.

For PhD students enrolled in the 4+4 scheme, this must contain a plan for finishing the MSc education including the total number of ECTS obtained in order to finish the MSc programme.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 2015 | | 2016 | | | | 2017 | | | | 2018 | | |
| Quarter | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 |
| Literature study |  |  |  |  |  |  |  |  |  |  |  |  |
| Design of setups for electrical and combined tests of materials |  |  |  |  |  |  |  |  |  |  |  |  |
| Test on composite materials’ electrical properties and combined tests |  |  |  |  |  |  |  |  |  |  |  |  |
| Design of setups for small-scale lightning shielding simulation test |  |  |  |  |  |  |  |  |  |  |  |  |
| Small-scale lightning shielding simulation test |  |  |  |  |  |  |  |  |  |  |  |  |
| Development of system critical parts for small/full-scale HV test on cross-arm |  |  |  |  |  |  |  |  |  |  |  |  |
| Electrical-and-mechanical combined test on small parts of composite cross-arm |  |  |  |  |  |  |  |  |  |  |  |  |
| Test of cross-arm phase-to-phase/ground insulation (LI, SI and AC in wet/dry) |  |  |  |  |  |  |  |  |  |  |  |  |
| Test and measurement of corona activities on cross-arm (dry/moisture) |  |  |  |  |  |  |  |  |  |  |  |  |
| Test on lightning protection performance of the pylon |  |  |  |  |  |  |  |  |  |  |  |  |
| Writing the thesis |  |  |  |  |  |  |  |  |  |  |  |  |
| PhD courses |  |  |  |  |  |  |  |  |  |  |  |  |
| Publishing of papers |  |  | C1 |  | C2 | C3 | J1 | C4 | C5 | J2 | J3 |  |
| Milestones |  |  |  |  | MS1 | MS3 | MS3 | MS4 |  | MS5 | MS6 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Activities finished | Activities being performed | Planned activities | Buffer time |

**MS1: Material selection.**

**MS2: Combined test.**

**MS3: Small-scaled lightning protection test.**

**MS4: Tests to verify insulation capacity.**

**MS5: Tests to verify dimensions.**

**MS6: handing the thesis**

*12 months: An updated time schedule for the entire project must be included.*

**b.** **Outline of thesis.** Outline the content of the thesis, including an indication on whether the thesis is expected to take the form of a collection of papers (which is recommended by the Doctoral School) or a monograph. This description could be organized by means of an overall table of contents.

In case of a collection of papers, the thesis must contain an extended summary. This summary must provide a general overview of the topic of the thesis including an account of the current state-of-the-art. The summary must further review the results of the following chapters and explain how the results are related to the current state-of-the-art. The summary must be written in sufficient detail that it can be read and understood as a stand-alone document.

Note that for each paper on which the thesis is based, a co-author statement must finally be submitted together with the thesis.

PhD students enrolled in the 4+4 scheme must pay special attention to the relation between the thesis for the qualifying exam and the PhD thesis. Material from the qualifying exam thesis cannot be a part of the material used to assess the student for the PhD degree. However, elements from the qualifying exam thesis can be included in the PhD thesis if this is deemed relevant e.g., for obtaining a coherent/self-contained exposition. If material from the qualifying exam thesis is included in the PhD thesis, this must be properly referenced according to good scientific practice. It should also be explained in the preface of the PhD thesis how material from the qualifying exam thesis has been included.

*12 months: update outline of content of thesis.*

**c.** **Tentative publication list.** Provide tentative list of publications. Regardless of the form of the thesis, it is recommended that results are documented and submitted for publication in peer reviewed outlets throughout the project. For each publication, the following should be indicated or estimated: working title, co-authors, length in pages, outlet (e.g., a named conference or journal), and approximate time of submission. Indicate who has the primary responsibility for the publication. Publications in journals indexed in Web of Science are encouraged (use the ISI service at <http://apps.isiknowledge.com/>).

*12 months: update list of papers.*

# Section 4. Supervisor/student co-operation agreements

Agreement on the relationship between supervisor and student (meeting frequency, communication forms, mutual expectations, etc.). The Doctoral School expects that the supervisor and student meet face to face regularly. See note on the homepage of the Doctoral School for inspiration: [https://www.phd.aau.dk/engineering-and-science/for-current-phd-students#forms-and-template](https://www.phd.aau.dk/engineering-and-science/for-current-phd-students).

It is necessary that the supervisor and the student conduct a meeting in which the mutual expectations are clarified before authoring this section.

*12 months: Status for relationship and updated agreement on the relationship between supervisor and student.*

# Section 5. Plan for PhD Courses (both general and project related courses)

Courses adding up to 30 ECTS credits must be outlined. Please use this table (**the two courses already listed are mandatory**):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Courses | Place/Organized by | ECTS | General/Project course | Status |
| **Introduction to the PhD Study** | **Aalborg University** | **0.5** | **General** |  |
| **Applying the Danish Code of Conduct for Research Integrity to your Research** | **Aalborg University** | **1** | **General** |  |
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|  | **Total** |  |  |  |

General courses concern PhD relevant competencies of relevance across several PhD-programs. Examples are courses regarding statistics as a tool in scientific research, courses on dissemination skills, or courses on career planning. Project specific courses cover topics specific to the PhD-program that the student belongs to, including topics of direct relevance for the student’s PhD project. Both types of course should cover a minimum of 10 ECTS. The sum of general and program specific courses must be at least 24 ECTS.

Study circle(s) and/or conference activities for a total maximum of 6 ECTS can be approved as PhD course activities with ECTS if a specific need is documented by main supervisor:

* No suitable PhD courses available for the PhD student in the portfolio of general and program specific courses can be found (must be motivated)
* The PhD student has very special academically specific course needs which cannot be covered existing portfolio of PhD courses (study circle using paradigm).

If such needs cannot be justified the PhD student must follow general and/or program specific PhD courses for a total of 30 ECTS.

Conference activities can account for 1 ECTS per conference and a maximum of 2 ECTS (2 conferences) can be approved as PhD course activities with ECTS. Paradigm for the outcome of conference participation must be filled and archived by main supervisor and The PhD student <https://www.phd.aau.dk/engineering-and-science/for-current-phd-students#forms-and-template>.

Study circle activities can account for up to 6 ECTS in total (if no conference ECTS are allocated). Paradigm for outcome of study circle participation must be filled and archived by main supervisor and the PhD student. <https://www.phd.aau.dk/engineering-and-science/for-current-phd-students#forms-and-template>.

In general, no single course should exceed 6 ECTS credit points. The estimated workload for the student is 28 hours per ECTS credit.

All courses must be at PhD level at identifiable institutions. If a course at master level is deemed to be highly relevant for the PhD project, the supervisor can establish a study circle on the topic, which includes the master course and additional reading/discussion to bring it up to PhD level. A master’s course can only be ascribed ECTS as study circle activity (i.e. up to 6 ECTS) if the course descriptions curriculum is not included in the PhD candidate’s master’s curriculum giving access to the PhD enrollment. The written report mentioned above on participation in a study circle must be completed to get ECTS. To ensure the scientific level, the study circle must be headed by a member of the scientific staff, who is Professor or Associate Professor (senior scientist level). The ordinary exam of the master’s course must be passed for the PhD student to be accredited ECTS.

For PhD students enrolled in the 4+4 scheme, the same course cannot count as part of both the PhD education and the MSc education.

By completion of the PhD study, documentation of the contents and the extent of the courses must be provided along with approval from the main supervisor.

*12 months: Update the course table.*

# Section 5b. Plan for MSc courses (ONLY 4+4 PhD students)

Indicate time, subject and ECTS for the Master courses to be completed during the first two years (part A)

# Section 6. Plan for fulfilment of knowledge dissemination

Plan for dissemination of knowledge and findings from the project (newspaper articles, seminars, conference presentations, teaching etc.). Dissemination is not only teaching but can also be other activities.

*12 months: update plan for dissemination.*

# Section 7. Agreements on immaterial rights to patents

Outline relevant agreements on immaterial rights to patents, etc. produced during the PhD project. Typically, it is sufficient to mention that IPR is handled via the standard university rules.

*12 months: Update this section if applicable.*

# Section 8. External co-operation

Outline a plan for external co-operation. One or two tentative co-operative institutions must be described.

Apart from generating research, the purpose of external cooperation is to expand the PhD student’s perception of research practice. The doctoral school expects that external cooperation is carried out in connection with a longer stay of minimum three months at another well esteemed research institution or company doing research since this is beneficial for the scientific and personal development of the PhD student. The doctoral school recommends that the stay takes place in the second year of the PhD study to benefit from the outcome of the stay in the third year. It is also recommended to have an outcome in the form of a joint paper with the hosting institution.

The co-operation must be an active research co-operation in which also the host institution contributes to the research. Summer schools, conference attendance etc. are not considered external cooperation.

*12 months: The description must be updated with completed and expected/planned co-operation activities (expected/planned must be specified).*

# Section 9. Career Plan (12-month’ plan only)

*12 months: Describe your long-term career plans, i.e., beyond the PhD studies. For example, do you plan to pursue a career in academia and, if so, what is the next step after graduation? Is it a postdoc abroad or an industrial postdoc after which you plan to become assistant professor? Or do you intend to become an industrial researcher, and, if so, in what industry and with what potential companies. In what role do you see yourself long-term. Do you, for example, see yourself as a technical specialist or is your ambition to become a research manager? Explain how your PhD study plan and the choices you have made herein supports your career plan (e.g., the courses you plan to follow, your plans for external collaborations and knowledge dissemination). Remember to use the resources provided by AAU PhD:* [*https://www.phd.aau.dk/phd-career-hub*](https://www.phd.aau.dk/phd-career-hub)

# Section 10. Financing budget

Information on the financing budget for the PhD project i.e., expenses needed to complete the project (not salary). The funding source or sources should be identified. This part is for information entirely and cannot be used to demand any resources from the department. Financing is governed by the specific agreement between the department and the PhD student, which is agreed upon by the time of enrolment.

*12 months: Update this section if applicable.*

# Section 11. References

List of essential references used in the PhD plan (e.g., in state-of-the-art) including authors, title, publication outlet, pages/volume/year and for conferences also town/country/dates. Include only peer reviewed publications (includes books from recognized publishers). The list should include the most important 10-25 references in the research field.

*12 months: Update this section if applicable.*