

# **Supplementary regulations for the PhD Degree in Mobile Communication Systems: Networks, Security and Formal Methods at the University of Agder**

*Adopted by the Board of Agder University College on 19 October 2005*

## **1. Scope of application**

These regulations apply to the PhD programme in Mobile Communication Systems: Networks, Security and Formal Methods (hereinafter called Mobile Communication Systems) at the University of Agder.

## **2. Objective**

The objective of the PhD programme in Mobile Communication Systems is independent research that leads to a scientific dissertation of a high, international standard. In addition, the PhD candidate will receive advanced training in theories and methodology in order to acquire a deep insight into and broad perspective of the relevant subject area.

## **3. Responsibility for the doctoral degree education**

The overall responsibility for the doctoral degree education at the University of Agder rests with the University's Board. The responsibility for the academic and administrative implementation of the programme has been delegated to the Faculty of Engineering and Science.

## **4. Organisation of the doctoral degree education**

The formal research education programme in Mobile Communication Systems at the University of Agder leads to the PhD Degree in Mobile Communication Systems. The duration of the programme is normally 3 years. Candidates have individual theoretical syllabuses. During the course of the programme, candidates should receive training in the dissemination of research work.

## **5. Admission**

Admission may take place at any time during the year. Applications for admission are decided by the Faculty Board.

### **5.1 Applicants' formal qualifications**

Applicants for the PhD programme must meet one of the following requirements:

- Hold a *sivilingeniør, cand.scient.* or Master's degree from a Norwegian university, or qualifications approved as equivalent;
- Have a different education and qualifications at Master's degree level which after individual evaluation are approved as a basis for admission, *or*
- Have an education from abroad (full degree) which is equivalent to minimum 4 years in the Norwegian university system and which, after individual evaluation, is accepted as a basis for admission (applicants of this category must provide an evaluation of the

education programme in question made by a Norwegian university or college which offers a Master's degree programme in the relevant subject area).

If the Faculty finds that the applicant lacks the qualifications required within the relevant subject area, it may impose additional requirements beyond to the obligatory PhD programme.

### *5.2 Criteria for admission*

As a general rule, the following shall apply:

- The average mark achieved for the Bachelor's degree should not be lower than C;
- The average mark achieved for modules at Master's Degree level or equivalent should not be lower than B; *and*
- The mark achieved for the Master's Degree thesis (or equivalent) should be B or higher.

In individual cases, where an applicant has lower marks, the application may still be considered if it is documented that the applicant in all probability will be able to successfully complete the PhD programme.

Applicants with little or no training in research work from previous education must reckon with needing more than the normal 2.5 years to complete their dissertation.

### *5.3 Right to study for applicants from other institutions*

Applicants who have not previously been students at the University of Agder will, on admission to the PhD programme, automatically be granted a right to study at the University and to take modules that form part of the training component without paying any tuition.

Applicants who want to take individual modules prior to acceptance of their PhD application will be considered ordinary students and must apply for admission to the relevant modules within the fixed deadlines. In such cases, they will have to pay tuition.

### *5.4 Partial funding and progression*

Applicants with their PhD programme only partially funded through grants shall agree to devote minimum 50 per cent of their working hours during the programme period to their research education and minimum one year to full-time study.

### *5.5 Required equipment*

Candidates shall have access to the equipment required for undertaking their research project. Decisions as to what is considered required equipment shall be made by the Faculty. For candidates with external funding and/or workplace, an agreement concerning equipment will be entered into for each individual research project.

## 5.6 Application and agreement

Applications for admission to the PhD programme are to be written on a special form prepared for this purpose. In the application, the applicant, together with one of the Faculty's academic staff, shall outline an overall plan for the PhD programme. On admission, an agreement will be entered into between the PhD candidate, the supervisor and the Faculty, in addition to an external institution, if relevant. The agreement shall stipulate the mutual rights and obligations of the parties. The agreement shall also indicate the theme for the dissertation, duration of the agreement, funding plan, supervisory arrangements, requirements with respect to academic and material resources, workplace and content of the training component (theoretical syllabus).

The application and the agreement shall be accompanied by the following:

1. Certified copies of certificates and transcripts of marks for all education beyond upper secondary school and up to and including *cand.mag./Bachelor's Degree*;
2. Certified copy of higher degree certificate;
3. List of courses/modules included in the applicant's Master's degree programme or equivalent;
4. Applicants with educational qualifications from a country other than Norway shall attach an evaluation of their education (refer to section 5.1);
5. Project description (see below);
6. List of publications if the applicant has published scientific work;
7. Description of special syllabuses, if any;
8. Examination results from/documentary evidence of examinations previously taken in courses/modules which the candidate is applying to have approved as part of the training component. The examinations must have been passed with a mark of 2.25/B, or better. These courses/modules must not have been taken more than 5 years before the time of admission;
9. Evaluation/description/information with respect to special courses/modules which the applicant wishes to have approved as part of the training component;
10. Other relevant information such as relevant work experience.

**The project description** should be 1-10 pages, including the list of references, be signed by the applicant and the supervisor, and include the following:

- An account of the theme, with information about the background of the project and how it is related to international research in the subject area;
- Clear problem statement. What is the aim of the investigations that will be carried out? Which methods will be used?
- Description of the data basis and the source material to be used, and how the data will be collected and analysed (if relevant);
- Schedule for the programme and controllable milestones, for instance when articles will be completed or examinations taken;
- List of references.

**Statement from the supervisor.** The principal supervisor must write and sign a statement which must accompany the application. The statement shall include the following elements:

- The supervisor's assessment of the applicant's potential for completing the relevant research project;

- The starting point for the research work, including information on whether the investigation is a continuation of the applicant's earlier work (such as published works), and whether parts of any such work are intended to be incorporated into the doctoral dissertation;
- For dissertations that are mainly based on joint work, it should be made clear what the applicant's contribution to the investigation will be;
- The resource situation for the project;
- Partners, if any, or research networks with which the applicant will be affiliated.

### *5.7 Admission procedure*

Applications for admission should be submitted to the Faculty which will decide on admission in accordance with the provisions applicable at any time. The Faculty shall ensure that all material resources required are available, and that the candidate be affiliated with an active research community.

The Faculty shall ensure that external supervisors will receive a copy of the PhD regulations, the Faculty's PhD programme, the rules relating to external supervision, the rules relating to copyright on PhD dissertations, the rules relating to the use of joint works, and the guidelines for the evaluation of candidates for Norwegian doctoral degrees.

### *5.8 Affiliation with several research communities*

If an applicant has a project where affiliation with several research communities will be desirable, a statement shall be obtained from these research communities. A tentative, proportionate division of the involvement of the various research communities and any external partners must be provided.

## **6. Completion of the PhD programme**

### *6.1 Stipulated and maximum duration of the course of study*

The PhD programme is normally a three-year period of full-time research education, of which the training component constitutes a minimum of 30 credits.

The PhD programme shall be completed (date of disputation) no later than 8 years after admission, unless an extension is granted due to special circumstances. Any leave of absence is not included in the eight-year period. Decisions as to whether the maximum period has been exceeded lie with the Faculty. Any reasoned complaints against such decisions should be submitted to the University for final decision.

### *6.2 Changes to the agreement*

Proposed changes to the agreement which would affect the completion of the research project are subject to approval by the Faculty. In the event of major changes, the Faculty must submit a copy of the matter to the University for its information.

### *6.3 Leaves of absence and extension of agreement*

Candidates who are unable to complete within the specified period of agreement, must apply to the Faculty for an extension. A special form has been prepared for this purpose.

Candidates who have a baby during the programme period have the right to ordinary maternity leave in accordance with the laws in force, and the agreement will automatically be extended accordingly.

In addition to ordinary maternity leave, the agreement period may in special cases be extended for a maximum of 6 months due to circumstances which have prevented the candidate from following normal research progression. Such circumstances may be special burdens of care or unforeseen work-related obstacles outside the candidate's control. However, such an extension will only be granted on the condition that the candidate will be able to complete the PhD programme within the extension period.

The period of agreement may also be extended for candidates who in addition to their research education take on other academic tasks. Such tasks are subject to agreement between the candidate and the supervisor.

### *6.4 Obligation to work*

Candidates with an obligation to work as part of their funding scheme can be required to:

- teach at any level, including participating in educational training and assisting in collecting and organising material for teaching purposes;
- undertake examination work in connection with the lessons given;
- provide supervision within their special fields;
- assist other researchers or research teams in various types of research work; *and*
- participate in other qualifying work at the Faculty, such as work on publications and consultancy, development and administrative work, etc.

The tasks that the candidate is required to do as obligatory work should as far as possible provide relevant experience for future appointments to research and teaching positions. Administrative duties should normally not exceed 10 per cent of the total number of working hours per year.

Candidates who stay abroad for a longer period of time when working on their PhD degree shall normally be exempted from obligatory work during this period.

### *6.5 Training component (theoretical syllabus)*

The training component shall comprise a minimum of 30 credits of which obligatory common modules constitute 16 credits. The remaining 14 credits shall comprise advanced specialisation modules which are closely related to the research project. In addition, candidates are to hold a trial lecture over a prescribed topic (refer to section 12.1).

The training component may also include courses/modules in dissemination or other relevant topics. The content of the training component must be such that it, together with the work on the

dissertation, provides the academic insight and breadth required.

The courses/modules included in the training component must be at an advanced level at the institution and must be approved by the Faculty as PhD level modules.

International research courses, evaluated by a relevant research community with respect to scope and level, may be included. In addition, a special syllabus in the form of literary or methodological studies relevant to the research project may be included. A description of subjects taken in the form of a special syllabus shall be provided on a special form with information about content, level, scope and examination form. All modules and courses to be included in the training component must have a final assessment. The training component must be completed and passed before candidates can apply to the Faculty for having their dissertation evaluated.

For examinations in the theoretical syllabus, a *pass* or *fail* is awarded. A *pass* indicates a high academic level.

If examinations taken previously are used as part of the theoretical syllabus, documentary evidence must be provided to show that satisfactory results were achieved, i.e. 2.25/B or better. Examinations taken more than 5 years before admission can normally not be included in the training component.

For the calculation of activities outside the credit system, the standard is that one normal working week (*an academic year being 40 weeks*), including examinations, corresponds to 1.5 credits. Such activities must also be assessed as a pass or fail in order to be accepted as parts of the training component. It is a condition that modules/courses included in the training component were not used as a basis for application and have not formed part of previously completed education modules.

If a candidate fails one of the examinations in the training component, a new examination can first be taken the following semester.

The responsibility for registering approved training for each PhD candidate lies with the Faculty.

The Faculty has the right to approve changes to the training component.

## ***6.6 Supervision***

Candidates should only in exceptional cases be assigned supervisors who are not part of a network of researchers working with similar problems. Each candidate will be affiliated with a supervisory committee of at least two supervisors. One of the supervisors shall be appointed principal supervisor. Supervisors are to be appointed by the Faculty.

The *principal supervisor* is the supervisor who has the administrative responsibility for the research education of a particular candidate. Generally, the principal supervisor will also be academically responsible for the candidate's research education. The principal supervisor shall belong to the Faculty or to an institution approved by the Faculty.

If the principal supervisor is from outside the University of Agder, a co-supervisor who holds a permanent position or a II position at the Faculty shall be appointed.

*Co-supervisors* are qualified persons who provide supervision, and who share the academic responsibility for the candidate.

All supervisors have a duty to maintain contact with the candidate and to inform themselves about the candidate's academic progress.

**Supervisors' responsibility:**

- Offer advice about the formulation and limitations of theme and problem statement;
- Discuss and consider hypotheses and methodology;
- Provide assistance in finding specialist literature and data sources (library, archives, etc);
- Discuss the plan for and organisation of the dissertation (outline, linguistic form, documentation, etc);
- Keep informed about the progress of the candidate's work and assess progress in relation to plan;
- Assist in introducing the candidate to relevant scientific communities;
- Discuss results and the interpretation of such results;
- Give the candidate guidance with respect to ethical research principles, *and*
- Supervise the candidate in his/her preparation of the dissertation in order that the dissertation meets the quality requirements in international scientific publications within the relevant subject area.

The candidate has a duty to keep the supervisors informed about his/her progress and submit drafts of written work to the supervisors.

**6.7 Residency requirement**

The PhD programme is a supervised doctoral degree education. This means that candidates normally must be present at the University of Agder for parts of the programme period unless prevented by special circumstances (residency requirement). Details of the residency requirement shall be provided in the agreement, and it is the responsibility of the supervisors to check compliance with this requirement. From the Faculty's point of view, the residency requirement is desirable in order to ensure that the candidate receives adequate training and to strengthen the academic community.

**6.8 Quality assurance**

The responsibility for the follow-up of the PhD candidates rests with the Faculty. Both the PhD candidate and his/her principal supervisor shall each year prepare independent progress reports to the Faculty. After submission of the reports, all candidates are invited to discuss their progress with the heads of Faculty. When all reports have been received by the Faculty, a summary will be submitted to the University. Any substantial deviations from a candidate's progress plan and other special circumstances shall be mentioned in the summary. Candidates who fail to submit a report after two reminders may be disqualified from the programme.

### *6.9 Termination of supervision agreement*

The doctoral degree candidate and the supervisor can agree to request the Faculty to appoint a new supervisor for the candidate. The current supervisor cannot resign before a new has been appointed.

If a PhD candidate or a supervisor finds that the other party fails to meet his/her obligations pursuant to these regulations, the party claiming breach shall take the matter up with the other party. The candidate and the supervisor shall co-operate to resolve the situation.

If a PhD candidate or a supervisor finds that the other party fails to meet his/her obligations pursuant to these regulations, and the parties fail to reach an agreement to resolve the situation after having discussed the matter, the candidate or the supervisor may request to be released from the supervision agreement. Such a request shall be addressed to the Faculty. A copy of the request shall be sent by the requesting party to the other party.

Decisions to release a PhD candidate and a supervisor from a supervision agreement lie with the Faculty, which then shall appoint a new supervisor.

### *6.10 Disputes*

Disputes relating to the academic rights and obligations of the supervisor and the candidate pursuant to these regulations may be brought before the Faculty by the parties. Complaints against decisions made by the Faculty may be lodged with the University.

### *6.11 Termination of the research education programme*

#### **Voluntary termination**

The parties can, on the initiative of the candidate or the other parties, agree to terminate the organised doctoral degree education prior to the agreed date. In the event of voluntary termination, issues relating to appointment, funding, rights to results, etc shall be provided for in a separate agreement.

If the voluntary termination is due to a candidate's desire to change research project, the candidate shall submit a new application for admission.

#### **Enforced termination**

The University of Agder may determine that a student's enrolment in a PhD programme be terminated prior to the previously agreed termination date. Such enforced termination may be decided if one or more of the following conditions apply:

1. Repeated and serious violations of the student's obligation to provide information, meet commitments, and submit reports in accordance with these regulations;
2. Major delays in the progress of the research project that are of such a nature as to raise

doubts about the candidate's ability to complete his/her project within the stipulated time period. In order to constitute grounds for enforced termination such major delays must be due to factors within the candidate's control;

3. Major delays in the completion of the organised training component due to factors within the candidate's control;
4. Violation of the ethical research standards in the candidate's subject area;
5. Behaviour by a candidate that is in violation of the trust that must exist between a university and its candidates, including any illegal activities related to the completion of the PhD programme.

Decisions about enforced termination shall be made by the Faculty.

If the doctoral candidate is employed by the University, the agreement may only be terminated if the conditions of the Civil Service Act are met.

## **7. The dissertation**

The dissertation may be submitted either in the form of a monograph or in the form of articles linked by means of an introduction to the work and a summary of the main results and conclusions. The summary shall not only sum up but also put the problems and conclusions presented in the individual parts in a holistic perspective and thus document a connection between the various parts of the dissertation.

In order for the dissertation to be evaluated, the main parts must be of a standard comparable to that found in international scientific publications in the relevant subject area. The candidate and the supervisor have both a responsibility for taking the publishing requirements into account when choosing a research project. During the work on the dissertation, parts of the work should, as a rule, be submitted for publication in international journals and/or be presented at international conferences.

The dissertation shall be available to the public in its entirety. The award of a PhD degree can only be based on the material available in the dissertation.

The dissertation shall, unless otherwise agreed in advance, be written in English. In addition, the candidate shall write a popular scientific article in Norwegian for dissemination purposes (or in English if the candidate has a mother tongue other than Norwegian).

If the doctoral work is a continuation of a Master's degree thesis or equivalent, the results from the latter may be incorporated in the doctoral dissertation provided that it is clearly stated that the results are taken from the candidate's thesis.

### *7.1 Patentable inventions and rights to use results*

The PhD candidate's rights with respect to the use of his/her own results, utilisation of patentable inventions, intellectual property rights, etc, are regulated by the University's general rules and

regulations in this area and the provisions of the Act relating to the Right to Employee's Inventions (arbeidstakeroppfinnerloven).

Those parts of the doctoral dissertation to which the candidate holds the sole intellectual property rights, and any other academic work resulting from the candidate's work on the dissertation and to which the candidate holds the sole intellectual property rights, may be reproduced by the University for use, free of charge, in its teaching and research activities. In the event of such use, the candidate's name shall be disclosed in accordance with the laws in force and good customary practice.

## **8. Application to have the dissertation evaluated**

No later than three months before the planned disputation, the PhD candidate must apply to the Faculty to have his/her dissertation evaluated. The training component must be completed and passed in its entirety before an application can be filed. The application, accompanied by 1 copy of the dissertation draft, is to be submitted to the Faculty.

If the application is accepted, an evaluation committee will be appointed. When the committee has been appointed the Faculty will send one copy of the draft to each of the evaluation committee members.

If the dissertation includes articles with more than one author, the following applies:

- For articles where the PhD candidate is the lead author, confirmation from the other authors regarding the candidate's share of the work will not be required;
- For articles where the PhD candidate is not the lead author, the lead author of the articles shall normally write a short statement granting permission to include the articles in the PhD candidate's dissertation. The statement shall indicate the extent of the candidate's contribution to the articles.

## **9. Appointment of evaluation committee**

The Faculty shall appoint an evaluation committee of at least three members, on the basis of proposals from the relevant academic staff, to evaluate the dissertation and the defence. The proposal must include the following:

- The final title of the dissertation;
- Full name, title and address of all the committee members;
- The evaluation committee shall, as far as possible, include members of both sexes, and at least one of the members shall come from a foreign institution. In the event of non-compliance with provisions, grounds must be given;
- A statement indicating how the committee as a whole covers the subject area of the dissertation;
- A statement that the proposed committee members have been asked and have confirmed that they are willing to undertake the task;
- A statement concerning the impartiality of the committee members. The provisions relating to disqualification in section 6 of the Public Administration Act apply to the committee members. Supervisor(s) and/or co-authors are barred from being members of the committee.

The Faculty shall inform the candidate and the evaluation committee members. In addition, the

Faculty shall ensure that the evaluation committee members receive a copy of the dissertation and a copy of the regulations in force at any time. The committee shall be informed about the deadlines applicable to the evaluation.

#### **10. The committee's report and further procedure**

The evaluation committee will have a period of 3 months from receipt of the dissertation to submit a statement and, if relevant, present suggestions for changes/adjustments to the dissertation.

If the evaluation committee finds that the dissertation may be defended without major changes, the PhD candidate shall be given a period of 1 month to incorporate these changes in the final dissertation. The disputation can take place without further consideration of the dissertation by the committee.

In the event that the evaluation committee finds that the dissertation presumably can be defended after revision, provided that major changes are made, the candidate shall be given a deadline within which to incorporate these changes in the final dissertation. The deadline shall normally be fixed at 6 months, but may be extended to maximum 1 year. When requesting such a revision, the committee has not rejected the dissertation, but will evaluate the revised dissertation at a later stage to determine whether it is worthy of being defended for the PhD degree.

If the evaluation committee finds that it will be impossible to correct the dissertation within one year, the dissertation shall be rejected. A PhD dissertation which has been rejected may only be submitted for evaluation in revised form once. A revised dissertation can first be submitted 6 months after rejection.

If a revised version of a dissertation is submitted for new evaluation, at least one member of the original evaluation committee should be involved in the new committee's work.

The committee's final report must be received by the Faculty *no later than 4 weeks* before the planned disputation, and must include the following elements:

- A short description of the contents and objectives of the work;
- The candidate's original contribution;
- The strong and weak aspects of the dissertation, *and*
- Comments regarding the standard of the candidate's dissertation in an international context.

The Dean may approve a decision made by the committee when the committee unanimously concludes that the candidate should be allowed to defend his/her dissertation. Other committee conclusions shall be considered by the Faculty Board.

#### **11. Submission**

If the dissertation is accepted for defence, 50 copies shall be available at the disputation and 7 copies shall be sent to the university library. The dissertation shall be printed and publicly available 2 weeks before the disputation, at the latest.

In addition, the candidate must submit to the Faculty 4 weeks before the planned disputation, at the latest, a popular scientific description of the work that has been carried out. The popular scientific description will be used as a press release and for dissemination purposes.

## **12. Trial lecture and disputation**

The evaluation shall include one trial lecture on a prescribed topic. The trial lecture must be approved before the disputation can be held.

### *12.1 Trial lecture*

The trial lecture shall test the candidate's scientific maturity, and consequently the topic shall lie outside the specialist area of the dissertation. In addition, the trial lecture shall test the candidate's ability to organise his/her material and time, and shall last for 45 minutes. The evaluation committee shall propose a theme/title for the trial lecture. The candidate shall be given 10 working days to prepare the lecture.

### *12.2 Report on the trial lecture*

After the trial lecture, the committee shall prepare a report on a special form. The following elements may be included in the evaluation of the trial lecture:

- The candidate's choice of material;
- The structure and organisation of the lecture;
- Comprehension and maturity;
- Presentation technique, including the use of visual aids.

The report shall conclude with the award of a pass or a fail.

### *12.3 Rejection of the trial lecture*

In the event that the committee finds that the trial lecture cannot be approved, the candidate will be given an opportunity to make a new attempt after 6 months, at the earliest. The new trial lecture should, as far as possible, be evaluated by the same committee as the previous lecture.

In cases where the committee finds the trial lecture unsatisfactory, the committee's report shall provide the candidate with advice on which aspects that need improvement.

### *12.4 Disputation*

The disputation shall be chaired by the Dean. If the Dean is prevented from doing so, the disputation may be chaired by the vice-dean or a senior researcher at the Faculty. The candidate's supervisor and the committee's administrator are barred from chairing.

The chairperson opens the disputation with a short, formal presentation of the candidate before an account is given of the appointment of the evaluation committee members and the delivery of the trial lecture. Then the candidate presents his/her scientific work. The candidate's presentation should not exceed 45 minutes.

Two of the evaluation committee members act as opponents. The first opponent places the candidate's scientific work in an international context before the discussion of the dissertation starts and the candidate is given the opportunity to defend his/her work. When both opponents

have completed their opposition, the chairperson invites the other persons present to take part in the discussion.

Finally, the PhD candidate delivers a short speech of thanks before the chairperson concludes the disputation.

After conclusion of the disputation, the chairperson is given the opportunity, on behalf of the evaluation committee, to announce the results of the disputation.

#### *12.5 Submission of report*

After the disputation, the evaluation committee shall prepare a report on a special form. The report shall include an assessment of the dissertation and its defence.

The dissertation will be given a mark of pass or fail.

#### *12.6 New defence*

If the defence of the dissertation is found to be unsatisfactory, the PhD candidate may be given the opportunity of a new defence once, and after 6 months, at the earliest. A new defence should, as far as possible, be evaluated by the same committee as the first defence.

### **13. Creation and certificate**

On the basis of the report from the evaluation committee and the Faculty that the trial lecture and the defence have been approved, the candidate will be created Philosophiae Doctor by the Board of the University of Agder.

The PhD certificate will be issued by the University. The certificate shall include the title of the dissertation and details on the academic training programme which the candidate has completed.

### **14. Appeals**

Reference is made to section 12 of the Regulations for the degree of Philosophiae Doctor (PhD) at the University of Agder.