General syllabus for third-cycle studies in Engineering Acoustics TEVTA00

The syllabus was approved by the Board of the Faculty of Engineering/LTH 24 September 2007 and most recently amended 12 March 2019 (reg. no U 2019/104).

1. Subject description

The main focus of research studies in Engineering Acoustics is building acoustics. The field of study has widened to embrace the whole spectrum from the propagation of sound in buildings to people’s experience of soundscapes. The available specialisations within building acoustics at the division are: measuring methods for indoor insulation and transmission of sound, psychoacoustic and statistical methods for assessing sound environments, and experimental methods for determining the acoustic properties of different materials.

The aim of the research is to produce the knowledge required to achieve soundscapes that are suited to different buildings. This work includes the development of design criteria and design tools. Design criteria are based on objective measurements of people’s experience of sound in different situations, whereas design tools are obtained on the basis of methods for calculating the propagation of sound in buildings and building components.

The following are examples of research projects:

- Experience of footstep sounds on different floor materials.
- Subjective assessment of the sound insulation of walls and joists.
- The impact of noise on people in school environments.
- Calculation models for determining sound insulation in light joists and walls.
- Calculation model for describing centre point damping between walls and joists.
- The acoustic function of resonance absorbers.
- Acoustic loss mechanisms in microperforated absorbers.
- Measurement methods for determining the propagation of sound in cracks.
- Sound insulation of low frequencies in light constructions.

2. Objective of third-cycle studies at LTH

The Board of LTH established the following objective for third-cycle studies on 15 February 2007.
The overall objective of third-cycle studies at LTH is to contribute to social
development and prosperity by meeting the needs of business and industry,
academia and wider society for staff with third-cycle qualifications. LTH shall
primarily provide education leading to a PhD or licentiate in the fields of LTH’s
professional degrees. The programmes are first and foremost intended for the
further training of engineers and architects. The programmes are designed to
courage personal development and the individual’s unique qualities.

Third-cycle graduates from LTH shall demonstrate:
− proficiency in research theories and methods and in a critical, scientific
  approach
− both breadth and depth of knowledge within the subject of his or her third-
cycle studies

The programmes aim to develop:
− creativity and independence with the ability to formulate advanced
  research issues, solve problems and plan, carry out and evaluate projects
  within a set time frame
− openness to change
− personal networks, both national and international
− social skills and communication skills
− teaching ability
− innovation skills, leadership and entrepreneurship

In order to enable students to achieve these skills and abilities, LTH provides:
− high-quality supervision and good conditions for study in a creative
  environment
− a good balance between basic and applied research, with openness to wider
  society
− a range of advanced third-cycle courses at both departmental and faculty
  level
− a good balance between courses and thesis work
− opportunities to present research findings at national and international
  conferences and in internationally recognised journals, or by another
  equivalent method which leads to wide exposure and circulation
− opportunities to spend time in international research environments for short
  or extended periods

3. Learning outcomes for third-cycle studies

The learning outcomes for third-cycle studies are given in the Higher Education
Ordinance.

3.1 Licentiate

Knowledge and understanding

For a Licentiate the third-cycle student shall:
− demonstrate knowledge and understanding in the field of research
  including current specialist knowledge in a limited area of this field as well
  as specialised knowledge of research methodology in general and the
  methods of the specific field of research in particular
Competence and skills
For a Licentiate the third-cycle student shall:
− demonstrate the ability to identify and formulate issues with scholarly
  precision critically, autonomously and creatively, and to plan and use
  appropriate methods to undertake a limited piece of research and other
  qualified tasks within predetermined time frames in order to contribute to
  the formation of knowledge as well as to evaluate this work
− demonstrate the ability in both national and international contexts to
  present and discuss research and research findings in speech and writing
  and in dialogue with the academic community and society in general
− demonstrate the skills required to participate autonomously in research and
  development work and to work autonomously in some other qualified
capacity

Judgement and approach
For a Licentiate the third-cycle student shall:
− demonstrate the ability to make assessments of ethical aspects of his or her
  own research
− demonstrate insight into the possibilities and limitations of research, its
  role in society and the responsibility of the individual for how it is used
− demonstrate the ability to identify the personal need for further knowledge
  and take responsibility for his or her ongoing learning

3.2 Doctor of Philosophy
Knowledge and understanding
For the degree of Doctor of Philosophy the third-cycle student shall:
− demonstrate broad knowledge and systematic understanding of the
  research field as well as advanced and up-to-date specialised knowledge in
  a limited area of this field
− demonstrate familiarity with research methodology in general and the
  methods of the specific field of research in particular

Competence and skills
For the degree of Doctor of Philosophy the third-cycle student shall:
− demonstrate the capacity for scholarly analysis and synthesis as well to
  review and assess new and complex phenomena, issues and situations
  autonomously and critically
− demonstrate the ability to identify and formulate issues with scholarly
  precision critically, autonomously and creatively, and to plan and use
  appropriate methods to undertake research and other qualified tasks within
  predetermined time frames and to review and evaluate such work
− demonstrate through a thesis the ability to make a significant contribution
  to the formation of knowledge through his or her own research
− demonstrate the ability in both national and international contexts to
  present and discuss research and research findings authoritatively in speech
  and writing and in dialogue with the academic community and society in
  general
− demonstrate the ability to identify the need for further knowledge
− demonstrate the capacity to contribute to social development and support
  the learning of others both through research and education and in some
  other qualified professional capacity
Judgement and approach
For the degree of Doctor of Philosophy the third-cycle student shall:
− demonstrate intellectual autonomy and disciplinary rectitude as well as the
ability to make assessments of research ethics
− demonstrate specialised insight into the possibilities and limitations of
research, its role in society and the responsibility of the individual for how
it is used

4. General and specific admission requirements
A person meets the general admission requirements for third-cycle courses and
study programmes if he or she:

1. has been awarded a second-cycle qualification, or
2. has satisfied the requirements for courses comprising at least 240 credits of
   which at least 60 credits were awarded in the second cycle, or
3. has acquired substantially equivalent knowledge in some other way in
   Sweden or abroad.

The higher education institution may permit an exemption from the general entry
requirements for an individual applicant, if there are special grounds. Ordinance

A person meets the specific admission requirements if he or she has

1. at least 90 credits in subjects of relevance to the field including at least 75
   second-cycle credits and a second-cycle degree project of at least 30
   credits in the field, or
2. a second-cycle degree in a relevant field.

Finally, the student must be judged to have the potential to complete the
programme.

Exemptions from the admission requirements may be granted by the Board of
LTH.

5. Selection
Selection for third-cycle studies is based on the student’s potential to profit from
such studies.

The assessment of potential in accordance with the first paragraph is made
primarily on the basis of academic results from the first and second cycle. Special
attention is paid to the following:
1. Knowledge and skills relevant to the thesis project and the subject of study. These may be demonstrated through documents appended to the application and at a possible interview.

2. An assessment of ability to work independently and to formulate and tackle research problems. The assessment could be made on the basis of the student’s degree project and a discussion of this at a possible interview.

3. Written and oral communication skills

4. Other experience relevant to the third-cycle studies, e.g. professional experience

6. **Degree requirements**

Third-cycle studies lead to a PhD or, if the student wishes or if it has been specified in the decision on admission, to a licentiate. The student also has the right to complete a licentiate as a stage in his or her third-cycle studies, but is not obliged to do so.

The requirements for a licentiate are:
- passed courses of at least 45 credits, and
- a passed thesis of a scope corresponding to studies of at least 60 credits

The thesis and courses shall comprise at least 120 credits in total.

The requirements for a PhD are
- passed courses of at least 75 credits, and
- a passed thesis of a scope corresponding to studies of at least 150 credits

The thesis and courses shall comprise at least 240 credits in total.

6.1 **Degrees awarded**

The programme can lead to the following degrees:

*Teknologi licentiatexamen*/Licentiate in Engineering
*Teknologi doktorsexamen*/Doctor of Philosophy in Engineering

or:
*Filosofie licentiatexamen*/Licentiate of Philosophy
*Filosofie doktorsexamen*/Doctor of Philosophy

**7. Course component**

The programme is to include courses. For each course, an examiner shall be appointed at the department that delivers the course. The examiner shall draw up a written syllabus which states the course title in Swedish and English, the learning outcomes of the course, the course content and the number of credits.

The individual study plan is to include details of which courses the individual student shall or may include in his or her studies and how many credits for each course may be included in the degree. Courses taken at other faculties or higher education institutions may also be included in the study plan.
It is compulsory to participate in and pass the course Introductory Workshop for Newly Admitted Doctoral Students at LTH (Introduktionskurs för nyantagna doktorander vid LTH) GEM056F or the equivalent.

The aim of the course component is to provide students with a broad scientific foundation for key aspects of the subject. The course component is to be adapted to the individual student’s prior knowledge, interests and research specialisation. The majority of the courses are to belong to the four areas listed below. For the remaining credits, courses in subjects such as mathematics, mathematical statistics, programming, experimental methods, academic writing and presentation techniques are recommended.

I. Research methods, research ethics and the theory of science  
II. Structural acoustics  
III. Spatial acoustics  
IV. Numerical techniques of modelling and simulation, especially the finite element method and statistical energy analysis with acoustic applications

8. Thesis
The programme shall include a research project documented in a licentiate or doctoral thesis.  
The research project is to be conducted and designed in consultation with the group of supervisors, see Section 9 Other rules and regulations.

8.1 Licentiate thesis  
The licentiate thesis is to be presented at a public seminar chaired by an external reviewer.

8.2 PhD thesis  
The PhD thesis is normally to be written in English and structured as a compilation thesis. It is to be of a quality that enables the majority of the papers to be published or publishable in internationally recognised journals.

9. Other rules and regulations  
Each doctoral student is to be supervised by a group of supervisors composed of the principal supervisor and at least one assistant supervisor. The principal supervisor must at least have the qualifications of a reader.

10. Transitional provisions  
This study plan takes effect immediately. PhD students admitted earlier can choose to complete the programme with the present syllabus but are also entitled to continue with their studies according to their existing study plan. (reg. no U 2014/717)

For doctoral students with an admission date of 1 January 2019 or later, it is compulsory to participate in and pass the course Introductory Workshop for Newly Admitted Doctoral Students at LTH (Introduktionskurs för nyantagna doktorander
vid LTH) GEM056F or the equivalent in order to fulfil the requirements for the degree.