



LUNDS UNIVERSITET

Lunds Tekniska Högskola

General syllabus for third-cycle studies in Food and Formulation Engineering, TEKLTFLF.

This syllabus was approved by the Board of LTH 20XX-xx-xx.

1. Subject description

The subject includes experimental and theoretical studies based on an engineering and scientific approach aimed to address issues of relevance for the food industry, pharmaceutical industry and other related industries, as well as a systems perspective of food production and consumption in society.

Studies of the subject may include: characterization of raw materials characteristics, principles for the development of formulations, the design and consequences of consumption of products with active health-promoting properties. Also included are the studies of changes that occur during the processing of raw materials and products, the engineering knowledge needed to design and optimize unit operations, and processing systems with regard to environmental impact, safety and economy, as well as the relationships between structure, chemistry, and consumer perceived quality attributes of the subject.

The subject deals with several interdisciplinary issues of particular importance to the development of industry, human health and the environment, which places special demands on this education. The graduate program in Food and Formulation Engineering should therefore highlight one or more of the subject's main aspects, namely: products, processes, and interactions with people.

Research aspects with products in focus:

Food technology, food chemistry and *formulation* are areas that deal with the chemical description of molecular and colloidal properties and highlights the link between biological processes, structure, and quality characteristics of complex systems such as foods, pharmaceuticals and consumer products.

Research Aspects of processes in focus:

Food engineering and *Dairy Technology* encompasses the engineering skills of modelling, hydrodynamics, heat and mass transfer, and performance evaluation that is needed to design and optimize unit operations, processes and technical systems for the food industry. *Dairy Technology* also includes functional properties of dairy systems and their influence on processing within the dairy industry.

Research Aspects with people in focus:

Nutrition considers humans and food, the impact of individual food components, foods or diets has on metabolism, the consequences and mechanisms for the over- and undernutrition, and other physiological mechanisms of importance for the health of the consumer. The health effects are studied in relation to chemical and physical properties of the foods. *Food hygiene*, where the relationship between humans and microbes is in focus, is dealing with the benefits and the risks created by microorganisms that grow spontaneously, intentionally added or cultured in food. The subject also includes food sensory experiences and system aspects of food production and consumption in society.

Depending on the individual research students' profile and specialization in the above research aspects, the composition of the doctoral education coursework vary to different degrees.

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 education of engineers and architects. The programmes are designed to encourage 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 timeframe
- 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 exam

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, and
- 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, and
- 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, and
- 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, and
- demonstrate the capacity to contribute to social development and support the learning of others both through research and education and/or in some other qualified professional capacity.

Judgement and approach

For a 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, and
- 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

General 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
2. has satisfied the requirements for courses comprising at least 240 credits of which at least 60 credits were awarded in the second cycle
3. has acquired 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.

Specific admission requirements

The specific admission requirements may be used to specify how the 240 credits included in the general admission requirements are to have been obtained. A person meets the specific admission requirements for second-cycle courses and study programmes if he or she has:

- at least 60 credits in the area of the research subject of which at least 30 credits is within the second-cycle courses and including an independent thesis work of at least 30 credits or
- a specific exam of relevance to the research subject, e.g. MSc in Engineering, MSc in Agronomics or other exam.

Finally, the student must be judged to have the potential to complete the programme. Exemptions from the admission requirements may be granted by the dean of LTH.

5. Selection

Selection for third-cycle studies is based on the student's potential to benefit 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 during an 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 and degree title

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 are not obliged to do so.

The requirements for a licentiate are:

- passed courses of at least 30 credits, and
- a passed thesis of a scope corresponding to studies of at least 90 credits

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

The requirements for a PhD are:

- passed courses of at least 60 credits, and
- a passed thesis of a scope corresponding to studies of at least 180 credits

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

6.1 Degree title

On completion of the programme, the research student will be awarded one of the following titles:

Licentiate in Engineering/Teknologie licentiatexamen

Doctor of Philosophy in Engineering/Teknologie doktorsexamen

or

Licentiate of Philosophy/ Filosofie licentiatexamen

Doctor of Philosophy/ Filosofie doktorsexamen

7. Course component

The programme shall 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 coursework consists of both elective courses and courses that are mandatory for the research subject and the chosen research field. Depending on the individual doctoral students' profile and in varying degrees, can affect the composition of the course part. The department board shall establish rules for design of the course part.

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.

8. Thesis

The programme shall include a research project documented in a licentiate or doctoral thesis.

Licentiate thesis and doctoral thesis shall follow the local guidelines by of the department board.

9. Other rules and regulations

The doctoral students shall undergo a mid-term control sometime after achieving 60 credits but before 180 credits is attained. Rules for the half time control is issued by the department board. A licentiate degree can substitute for half-time control.

10. Transitional provisions

Graduate students adopted for postgraduate studies in Food Technology, TEKLG01, Food Chemistry, TEKNLFLK, Food hygiene, TEKLGFLH, Applied Nutrition TEKNLF00 or Pharmaceutical Technology, TEKFKFLT before the general syllabus in Food and Formulation Engineering, TEKLTLF is in force, may choose to pursue their education according to the new general syllabus or to continue their studies under the previous rules.