LUND UNIVERSITY

LTH
FACULTY OF ENGINEERING

Programme Syllabus

Master's Programme in Pharmaceutical Technology: Discovery, Development and Production

- Faculty: Faculty of Engineering, LTH
- Programme code: TALAK
- Credits: 120
- Admission level: Bachelor's degree
- Degree level: Second cycle
- Approved by: Programme Board B/K
- Approval date: 4 February 2026
- Validity: Academic year 2026/2027
- Entry into force: 4 February 2026

1 Aim and outcomes

1.1 Aim

This internationally oriented master's programme aims to provide specialised theoretical knowledge in a practical technological context in order to make students employable for advanced tasks in society and industry.

The programme aims to provide qualifications for both professional activities in society and industry and for research studies.

The programme is to provide

- in-depth knowledge within the field of pharmaceuticals with focus on discovery of active pharmaceutical compounds and formulation of these,

- understanding of the entire chain in discovery and development of a new drug product including how drug products are manufactured,
- in-depth understanding of pharmaceutical products based on a molecular approach covering both small organic molecules and biologics. The main topics of the programme include drug chemistry, pharmacology, biological drugs, drug formulation, quality systems of the pharmaceutical industry and how to characterize drug substances and drug products. The programme does not focus on preclinical and clinical research,
- training in how to plan, complete and assess experiments, and an ability to use theoretical framework models to describe physical, biological and chemical processes as well as to assess the applicability and limitations of these models in different contexts,
- ability to create and develop products with the desired biological effect as well as high patient acceptance, following the requirements by the authorities concerning quality safety and efficacy, and ability to consult both specialized and scientific literature.

1.2 Outcomes for a Degree of Master of Science (120 credits)

(Higher Education Ordinance 1993:100)

Knowledge and understanding

For a Degree of Master of Science (120 credits) the student shall

- demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work, and
- demonstrate specialised methodological knowledge in the main field of study.

Competence and skills

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information,
- demonstrate the ability to identify and formulate issues critically, autonomously, and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work,
- demonstrate the ability in speech and writing both nationally and internationally to report clearly and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and
- demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

Judgement and approach

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work,
- 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.

1.3 Specific outcomes for a Degree of Master of Science (120 credits) in Pharmaceutical Technology

For a Degree of Master of Science (120 credits) in Pharmaceutical Technology the student must demonstrate the knowledge and skills

required for working independently in research and development or in another advanced context within the area of pharmaceutical technology: discovery, development, and production.

Knowledge and understanding

For a Degree of Master (120 credits) the student shall

- demonstrate in-depth knowledge of the scientific basics and of science and technology disciplines relevant to the fields of medicinal chemistry and pharmacology, pharmaceutical formulation, and biological drugs,
- demonstrate knowledge of the quality systems that control the pharmaceutical industry,
- demonstrate insight into current research methods and development work in the area of pharmaceutical discovery and pharmaceutical development, and
- demonstrate in-depth methodological knowledge about how to characterize drug substances and drug preparations in terms of chemical, biochemical and physical properties.

Competence and skills

For a Degree of Master of Science (120 credits) the student shall

- demonstrate ability to systematically assess the desired pharmacological profile of a drug substance and based on this suggest strategies for the development of such a drug substance in terms of both small molecules and biological drugs,
- demonstrate ability to suggest a pharmaceutical formulation based on the characteristics of a drug substance and the desired pharmacokinetic profile of the drug,
- demonstrate the ability to participate in research and development projects in the field, and also have an understanding of those parts of a drug development that are not primarily included in the educations such as clinical trials,
- demonstrate the ability to acquire new knowledge within the field, for example through literature studies and integrate this with previous knowledge,

- demonstrate the ability to in international contexts report laboratory work, literature reviews and various forms of project work both verbally and written as well as the ability to follow the industry-established standard for writing different types of documents,
- demonstrate the ability to develop and design drug products taking into account the patient's needs and situation as well as the local and global society's goals for a sustainable development,
- demonstrate the ability to independently plan and carry out experimental work, to implement qualified tasks in the field, to work with major project tasks, and
- demonstrate the capacity for collaboration in various constellations.

Judgement and approach

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to make assessments in the field of drug discovery, development and production, informed by relevant disciplinary, social and ethical aspects, such as ethical rules for drug research and understanding patient needs,
- demonstrate the ability to analyse and critically assess different technical solutions in the field,
- have an understanding of the ethical aspects of research including the ethics in experimental sciences, preclinical and clinical research,
- demonstrate the ability to analyse and critically assess different technical solutions in the field including evaluating the safety and quality aspects of a drug product, and
- demonstrate the ability to identify their need for further knowledge in the field and to continuously develop and broaden their knowledge and skills in the field.

2 Programme structure

The program comprises 120 credits including 52.5 credits compulsory courses, 15 credits of elective-compulsory courses, 22.5 credits optional courses within the program and a degree project of 30 credits. Each year, the programme is adapted to the current pharmaceutical specialisation of the Engineering programmes in Biotechnology Engineering and Chemical Engineering. The range of courses offered includes relevant courses from other specialisations.

2.1 Courses

The courses included in the programme are indicated in the timetable. In addition to these courses, students are entitled to accreditation of 7.5 credits of courses in Swedish (organised by Lund University for exchange students).

2.2 Further studies

On completion of the second-cycle degree, students have basic eligibility for third-cycle studies.

3 Admission requirements

A Bachelor's degree in chemical engineering, biotechnology, chemistry, medicinal chemistry or equivalent. At least 10 credits/ECTS in completed, dedicated in mathematics/statistics courses, of which at least 5 credits mathematics. Completed courses of at least 60 credits/ECTS in chemistry, chemical engineering and/or biotechnology of which at least 5 credits/ECTS in organic chemistry and 5 credits/ECTS in biochemistry/cell biology. English 6.

4 Degree

4.1 Degree requirements

For a Degree of Master of Science (120 credits) students must successfully complete courses comprising 120 credits, including a degree project worth 30 credits. At least 90 credits must be second-

cycle credits and at least 60 credits of those must be in the main field of study, including the degree project.

4.1.1 Degree project

The degree projects included in the programme are listed in the timetable.

4.2 Degree and degree certificate

When students have completed all the degree requirements, they are entitled to apply for a certificate for a Degree of Master of Science (120 credits). Main Field of Study: Pharmaceutical Technology.