



**Title of study programme in Swedish**

Masterprogram i utveckling av system för försvar och säkerhet

**English title**

Master's Programme in Defence and Security Systems Development

**Higher education credits:** 120

**Programme code:** 2USF1

**Applies from:** Autumn term 2019

**Date of establishment:** 05.02.2019

**Programme director:** Department of Military Studies

**Decision:** This program syllabus was approved on February 5, 2019, by the Swedish Defence University Board of Research and Education.

**Education cycle:** Second cycle

**Content and structure of the study programme**

The Master's Programme in Defence and Security Systems Development covers 120 ECTS credits and is an international Master's programme. The main field of study, Systems Science for Defence and Security, is found at the intersection of social sciences and engineering.

The purpose of the study program is for the student to acquire the necessary knowledge in the main field of study, Systems Science for Defence and Security, to be able to critically review, evaluate, analyse and communicate phenomena such as needs, requirements and technical solutions related to defence capability on proven scientific and empirical grounds. The student shall acquire the knowledge and expertise required to make independent, critical assessments, the ability to independently, or in collaboration, solve complex problems, and the ability to follow developments in knowledge at the cutting edge of research in the field. The Master's program are hence fulfilling double purposes. In addition to preparing the students for undertaking scientific research, the study programme further educates students towards specialised systems engineering tasks for analysing and developing defence capability, thereby qualifying them for key roles in public authorities with total defence responsibilities, or in private-sector defence and security companies.

The study programme shall provide the student with the prerequisites for continuously developing their methodological competence and a scientific approach. The students is expected to shoulder increasing responsibility for his or her own education as they progress through the programme and successively acquire professionally relevant, research-based knowledge and expertise. Knowledge will be conveyed and acquired through teaching, individual study, exercises, group work, seminars and individual oral and written assignments. The study programme provides opportunities to acquire knowledge and exercise abilities through internship. Throughout the study programme, great emphasis will be systematically placed on written and oral presentations. The progression of the

study programme should lead to a higher level of intellectual maturity and deeper insights in the complexity of the subject. This, together with the ability to integrate knowledge and expertise and independently and creatively formulate and solve problems, will be presented in a final Master's thesis. Studies are structured so that, irrespective of the student's path of entry into the programme, they will acquire the necessary knowledge of qualitative and quantitative methods prior to beginning work on their dissertation.

The study programme reflects current activities at the Swedish Defence University, and is well-grounded in existing research. Teachers actively conduct research into systems science for defence and security or supporting subjects. After graduation, the opportunity exists to apply for third-cycle studies at the national and international higher education institutions with which the Swedish Defence University collaborates.

The study programme is conducted with good cooperation from stakeholders and the surrounding community. It takes place at the Swedish Defence University, a unique meeting place for researchers, students and military and civilian professionals with an interest in crisis management and security issues. The Swedish Defence University enjoys well-established collaborations with other stakeholders, both public authorities such as the Swedish Armed Forces, the Swedish Defence Materiel Administration (FMV) and the Swedish Civil Contingencies Agency (MSB) and private-sector defence and security companies. This stimulates a practical focus during studies, as well as strengthening opportunities for placements at relevant workplaces.

### **Courses included in the programme**

The first academic year commences with first-cycle courses up to a maximum of 15 ECTS credits. Which courses the student studies depends on whether his or her prior studies are in social science or engineering. The different entrances are designed to provide students with a common foundation for the progressive acquisition of subject knowledge. The academic year continues at second-cycle level by looking in more depth at theories and methods for systems science for defence and security. The first year concludes with compulsory courses on the application of theories and methods to systems. The second year covers a flexible range of courses designed to broaden or deepen knowledge of working with systems, and the final degree project. The degree project and those courses that provide a strategic and international-law perspective are compulsory, while the remaining courses are elective. The student can also choose a internship with a public authority, private-sector company or another relevant stakeholder in the field. An internship can then be arranged after the completion of the degree project.

Both compulsory and elective courses are normally held once a year. The range of elective courses may vary from year to year, and can also be limited based on the students' priorities. Certain elective courses have specific entry requirements. After the initial introductory courses, all compulsory courses are at second-cycle level. First-cycle courses equivalent to a maximum of 15 ECTS credits may be included in the Master's degree.

The range of elective courses is determined one term in advance, whereupon students will be informed of the available courses and the deadline for choosing courses and the date of the selection process. The selection is based on the criteria: priority according to the student, the total of acquired ECTS credits in the study programme at the date of application, and the total of ECTS credits with a VG grade obtained in the study programme. Lots will be drawn in the event of equal merits.

Compulsory courses (scope/subject other than defence systems)

Term 1:

*For students with a prior degree in Social Science:*

Introduction to Engineering for Social Scientists (15 ECTS credits)

*For students with a prior degree in Engineering:*

Leadership in the Officer's Profession for Engineers (7.5 ECTS credits)

Warfare and Flexibility (7.5 ECTS credits)

*In common:*

Theory for system science for security and defence (15 ECTS credits)

Term 2:

Methods in Systems Science for Defence and Security (15 ECTS credits)

Usability and Design of Interactive Systems (4.5 ECTS credits)

Concept Development and Systems Engineering (10.5 ECTS credits)

Terms 3 and 4:

Introduction to International Law, War and Technology (3 ECTS credits)

Strategic Management of Capability Development and Defence Acquisition (7.5 ECTS credits)

Master's thesis in Systems Science for Defence and Security (30 ECTS credits)

Elective courses

(example courses – subject to change)

At least one of courses selected must be studied at the Swedish Defence University.

Terms 3 and 4:

Cyber Operations in Antagonistic Environments (7.5 ECTS credits)

Design of Command and Control Systems (7.5 ECTS credits)

A Systems Perspective for Total defence – Advanced Course (4,5 ECTS credits)

Threat and Risk Management (7.5 ECTS credits)

Logistics Supporting Defence Systems (7.5 ECTS credits)

Operational and Ethical Aspects of Autonomous Systems (7.5 ECTS credits)

Internship (15 ECTS credits)

Internship (12 ECTS credits)

Weapons Effect and Protection Against Weapons Effect (7.5 ECTS credits)

As elective courses, it is also possible to transfer credits from other second-cycle courses relevant to the Degree of Master of Science in Systems Science for Defence and Security, such as complimentary courses in other subjects taught at the Swedish Defence University or courses offered in collaboration with other Swedish or international higher education institutions.

## **Intended learning outcomes of the study programme**

### **Scope**

A Degree of Master of Science is awarded once the student has completed course requirements for 120 ECTS credits, at least 60 ECTS credits of which are within the main field of study, Systems Science for Defence and Security, including an independent degree project of 30 ECTS credits. This requirement is ensured by completing the compulsory courses.

### **Outcome**

According to the Ordinance for the Swedish Defence University (2007:1164)

#### *Knowledge and understanding*

For the Degree of Master of Science, the student shall have:

demonstrated knowledge and understanding in the main field of study, including both an overview of the field and specialised knowledge in certain areas of the field as well as insight into current research and development work; and

demonstrated specialised methodological knowledge in the main field of study.

#### *Competence and skills*

For the Degree of Master of Science, the student shall have:

demonstrated the ability to integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information;

demonstrated the ability to identify and formulate issues autonomously as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames;

demonstrated the ability in speech and writing 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

demonstrated the skills required for participation in research and development work or employment in some other qualified capacity.

#### *Judgement and approach*

For the Degree of Master of Science, the student shall have:

demonstrated 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;

demonstrated insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used; and

demonstrated the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

### **Independent project**

The study programme includes an independent degree project on systems science for defence and security. This independent project may cover less than 30 ECTS credits, but not less than 15 ECTS credits, if the student has already completed a dissertation at second-cycle level covering a minimum of 15 ECTS credits in the field of defence systems or equivalent from an overseas study programme.

### **Local outcomes**

For the Degree of Master of Science in Systems Science for Defence and Security, the student shall also have:

demonstrated the ability to apply a critical approach to identifying and discussing the various perspectives of stakeholders on the development of defence and security capabilities.

### **Prior knowledge**

Degree of Bachelor of Science in Military Studies; alternatively, a bachelor's degree or professional qualification with a minimum of 180 hp/ECTS credits, including a minimum of 90hp/ECTS credits in the field of defence and security, and a minimum of 15 hp/ECTS credits for studies of the relationship between technology and defence and security organisations; alternatively, a bachelor's degree in Engineering or equivalent.

There are additional requirements for proficiency in Mathematics equivalent to Ma 3b or 3c, Physics equivalent to Fy 2 and English equivalent to English B/English 6.

Certain elective courses have specific entry requirements in order for the student to benefit from the education.

Selection: Selection is based on a weighted assessment of grades obtained in qualifying degrees, and a personal letter.

### **Degree**

The program leads to the Degree of Master of Science in Systems Science for Defence and Security.

The degree designation is as follows:

Degree of Master of Science (120 credits) in Systems Science for Defence and Security.

### **Interim regulation**

In the event that this study programme is no longer available or the programme's content has changed significantly, the student is entitled to be examined on courses

within the programme once per semester over a period of our semesters. During this period the restrictions specified in course syllabuses apply.

### **Other**

Entry requirements for courses for students admitted to the program: Certain courses during the latter part of the programme have specific entry requirements over and above the entry requirements for the study programme. These specific requirements mean that the student must have a certain number of credits from specified courses taken earlier in the study programme. The exact provisions are stated in individual course syllabuses.

Students are covered by the university's systematic work environment management and gender equality and equal opportunities policies. Teachers strive to apply a gender perspective to all education.

The university works continuously to internationalise the education offered, including by expanding its Erasmus network. Internationalisation is benefited by English-language course literature.

Student participation is ensured by representation on subject and study programme committees.