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Programme Syllabus

Master´s programme in Defence and Security Systems Development

Masterprogram i utveckling av system för försvar och säkerhet

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Scope	120.0	**Decided by**	Research and Education Council of the Swedish Defence University
Programme Code	2USF3	**Decision date**	2022-02-24
Valid from Semester	Autumn 2022	**Department**	Department of Systems Science for Defence and Security
Education Cycle	Advanced level	**Revision**	1.1

The Main Content and Format of the 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 is Systems Science for Defence and Security.

Systems Science for Defence and Security is part of the defence, crisis management and security fields of study, and is found at the intersection of social sciences and engineering. The programme's objective is for the student to acquire the necessary knowledge in the main field of study to be able to critically review, evaluate, analyse and communicate phenomena such as needs, requirements and technical solutions related to defence capability. Thereby, the student develops 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. Thus, in addition to preparing the students to undertake scientific research, the programme further educates students towards specialised systems engineering tasks to analyse and develop defence capability, qualifying them for key roles in public authorities with total defence responsibilities, or in private sector defence and security companies.

The programme will provide the student with the prerequisites to continuously develop their methodological competence and a scientific approach. Students are expected to shoulder increasing responsibility for their 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 internships. Throughout the study programme, there will be considerable systematic emphasis on written and oral presentations. The progression of the study programme should lead to a higher level of intellectual maturity and deeper insights into the complexity of the subject. This, combined with the ability to integrate knowledge and expertise, and to formulate and solve problems independently and creatively, will be presented in a final master's thesis. Studies are structured so that, regardless of students entry path into the programme, they will acquire the required knowledge of qualitative and quantitative methods before starting work on their thesis.

The programme reflects current activities at the Swedish Defence University, and is well founded on existing research. Teachers actively conduct research into systems science for defence and security or supporting subjects. After graduation, there are opportunities to apply for third-cycle studies at national and international higher education institutions.

The programme involves good cooperation with stakeholders and the surrounding community. The Swedish Defence University enjoys well-established collaboration with other stakeholders, including public authorities, such as the Swedish Armed Forces, the Swedish Defence Materiel Administration (FMV) and the Swedish Civil Contingencies Agency (MSB), and with private companies in the defence and security sector. This stimulates a practical focus during studies, and strengthens opportunities for placements with relevant employers.

Courses

The first academic year commences with courses of 15 ECTS credits, which introduce students to the field. The courses students take depend on whether their previous studies are in social sciences or engineering. The different entrance paths are designed to provide students with a common foundation for the progressive acquisition of subject knowledge. The academic year continues with joint studies taking a more in-depth look at theories for the study of defence and security systems. The second term includes a course on methods for defence and security systems development, a course intended to provide a strategic perspective on systems design in the defence and security sector, and the first opportunity to take an elective course. The aim of elective courses in the programme is to provide flexible means to broaden or deepen knowledge in systems design.

The second year provides more opportunities for elective courses, but also includes the three remaining mandatory courses. Two of these are intended to develop a usability and an international-law perspective, respectively, on professional work in the sector. The third covers the degree project. The student can choose an internship with a public authority, a private-sector company or another relevant stakeholder in the field. The internship is then completed as one of the elective courses.

Both compulsory and elective courses are normally held once a year. The range of elective courses can vary from year to year, and may be limited depending on student priorities. Certain elective courses have specific entry requirements. The introductory courses in Leadership, Command and Control Science, and in International Law, respectively, are at first-cycle level, covering 10.5 ECTS credits, while the other 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 dates for selection processes.

Compulsory courses (scope/subject other than defence systems)

Term 1:

For students with a bachelor's degree with a minimum of 180 hp/ECTS credits, including a minimum of 90hp/ECTS credits in the field of defence, crisis management and security:

Introduction to Engineering for Social Scientists (15 ECTS credits)

For students with a prior degree in engineering or equivalent:

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

Introduction to military thinking for engineers (7.5 ECTS credits)

Common courses:

Term 1:

Theory for System Science for Security and Defence (15 ECTS credits)

Term 2:

Methods in defence and security systems development (15 ECTS credits)

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

Terms 3 and 4:

Usability and Design of Interactive Systems (4.5 ECTS credits)

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

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

Elective courses

(example courses – subject to change)

Courses covering at least 15 ECTS credits must be completed at the Swedish Defence University.

Terms 2, 3 and 4:

Cyber Operations in Antagonistic Environments (7.5 ECTS credits)

System Perspectives for Comprehensive National Defence (4,5 ECTS credits)

Threat and Risk Management (7.5 ECTS credits)

Critical Security Studies and Technology (7.5 ECTS credits)

Logistics Supporting Defence Systems (7.5 ECTS credits)

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

Internship (12 or 15 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 complementary courses in other subjects taught at the Swedish Defence University or courses offered in collaboration with other Swedish or international higher education institutions.

Programme Objectives

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 for 60 ECTS credits is ensured by completiong of the compulsory courses.

Outcome

In accordance with the Swedish Defence University Ordinance(2007:1164):

Knowledge and understanding

For the Degree of Master of Science, the student will:

- demonstrate knowledge and understanding in the main field of study, including a broad overview of the field, specialised knowledge in certain areas of the field and greater insight into current research and development work; and
- demonstrate specialised methodological knowledge in the main field of study.

Competence and skills

For the Degree of Master of Science, the student will:

- demonstrate the ability to integrate knowledge critically and systematically, and to analyse, assess and deal with complex phenomena, questions and situations even with limited information;
- demonstrate the ability to: identify and formulate questions independently and creatively, and, using appropriate methods, to plan, undertake and evaluate advanced tasks within predetermined timeframes, thus contributing to knowledge development;
- demonstrate, both in a national and international context, the ability orally and in writing to report and discuss clearly his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences; and
- demonstrate the skills required to participate in research and development work or to work independently in other advanced activities.

Judgement and approach

For the Degree of Master of Science, the student will:

- demonstrate, the ability to make assessments in the main field of study informed by relevant scientific, social and ethical aspects, and
- 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 his or her own need for further knowledge and to take responsibility for his or her ongoing learning.

Independent project

The 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 will also:

- 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.

Entry Requirements

A bachelor's degree with a minimum of 180 hp/ECTS credits, including a minimum of 90hp/ECTS credits in the field of defence, crisis management and security; alternatively, a bachelor's degree in Engineering or equivalent.

The degree will include a documented, graded, written thesis project including a minimum of 15 ECTS credits, 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.

Degree

The programme 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.

Miscellanous

Entry requirements for courses for students admitted to the programme: 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.

Some of the elective courses have specific entry requirements and some of the courses are conducted in Swedish.