

## *Forum Securitatis Courses*

### **Resilience Engineering of Command and Control Systems**

#### ***Description***

As a result of new technology and complexity in crisis management, the development of crisis management command and control (C2) systems in a way that makes the crisis management system as a whole resilient, is an increasing challenge. The course objective is to provide an understanding of the development of C2 systems for crisis management. The course includes the following subjects: Command and control, C2 systems, Systems engineering, IT-security in C2 systems, and Resilience Engineering. After the course the students have obtained an understanding of the development of technology-intensive management systems for crisis management.

#### ***Organization***

The course is divided into two parts; an introductory part (1 ECTS credit) and a more advanced part (2 ECTS credits) focusing more on the underlying techniques used. The introduction contains lectures on command and control systems, systems engineering, and resilience engineering (6 hours), and an individual or group assignment where a crisis scenario or command and control system issue is analyzed in a written report. (20 hours). The advanced part contains additional lectures (12 hours), a project assignment (40 hours), and a workshop where the projects are presented (4-6 hours). For the assignment, the students are expected to pick a set of concepts, a technique or a methodology presented in the lecture series, and reflect on how it can be applied in the students' own research as well as put in the context of a relevant crisis management scenario or C2 system.

#### ***Examination***

**Introduction part** (1 ECTS credit): active participation in lectures and a written report on an assignment.

**Advanced part** (2 ECTS credits): active participation in lectures, a written report on a project assignment, and a presentation of the project at the final workshop.

#### ***Literature***

Selected reports, book chapters and journal articles.

#### ***Target group***

Doctoral students in the Forum Securitatis graduate school.

In case of vacancies, graduate students in other graduate schools and Master students in relevant programs, such as cognitive science, behavioural science, or engineering programs, can participate in the course.

#### ***Prerequisites***

None.

**Course language:** English or Swedish (if all participants speak Swedish).

## Comparison with related courses at Linköping University

The Master's program in Cognitive Science provide basis courses in Usability testing (course code 729A99), Behavior in Complex Systems (729A71), Advanced Interaction Design (729A88), and Risk and Accident Analysis (729A98). These courses are general and are not focusing on a specific application area.

This course is focusing on command and control systems, resilience in a societal perspective, and resilience engineering. This course presents the specific scientific approaches that are applied within safety and security research.

## Contact persons

Name	Function	E-mail, phone
Dr Rogier Woltjer, FOI	Course leader, registration	<a href="mailto:rogwol@foi.se">rogwol@foi.se</a> , 013-37 85 73
Prof Niklas Hallberg, LiU/FOI	Examiner	

## Schedule

Lecturers: Rogier Woltjer, Niklas Hallberg, Björn Johansson, Pär-Anders Albinsson, Jonas Hallberg, Amy Rankin, Helena Granlund, Peter Nilsson

Day 1 - Introduction (9:00-16:00), 20170428			
Le	Topic	Time	Lecturer(s) (TBD)
1	Introduction to the course	20 min	Niklas, Rogier
2	Command and control systems	0,5 h	Niklas
3	Systems engineering	2 h	Niklas, Helena
4	Resilience: Concepts and frameworks	3 h	Rogier, Amy
Day 2 - Advanced part 1 (9:00-16:00), 20170512			
5	Business analysis and modelling	2 h	Peter
6	Needs assessments and requirements engineering	2 h	Niklas
7	Resilience engineering: methods and techniques	1 h	Rogier
8	IT-security aspects	1 h	Jonas
Day 3 - Advanced part 2 (9:00-16:00), 20170519			
9	Design: Systems Architecture	1,5 h	Peter
10	Design: User-centered design	1 h	Pär-Anders
11	Evaluation - computer based: F-REX	1 h	Pär-Anders, Dennis
12	Command and control agility and crisis resilience	2,5 h	Björn, Rogier, (ev Amy)
Day 4 - Advanced part 3 (9:00-16:00), 20170616			
13	Discussion of term papers	1 h per paper	

## Dates and place for the course 2017

Dates and time are given in the schedule above.

Room: TBD

Travel: Buss 12 and 20 goes regularly from the Railway station to Campus Valla.