

Studieplan 2009/2010

Master of Science in Information Security

Innledning

Information technology permeates all aspects of society and has become critical to industry, government, and individual well-being. Securing these vital services and structures and the availability of trustworthy information whenever and wherever it is required has become both an area of intensive research and also of burgeoning commercial activity. A master of science in information security will provide the students with the knowledge and theoretical background as well as with the requisite skills and attitudes to succeed in this challenging yet eminently rewarding field.

[Go to course table](#)

Studiets varighet, omfang og nivå

This is a two-year master program (120 ECTS credits) which is also available part-time over three or four years. The degree awarded upon completion is “Master of Science in Information Security”.

The program has two tracks: management and technology. Students have to choose which track they pursue when entering the program (see the course structure below).

The program qualifies students to proceed to Ph.D. studies.

Forventet læringsutbytte

Upon completion of the programme, the students will have a solid understanding of the interdisciplinary field of information security. The graduated students will be proficient in core topics such as security management, computer and network security, and will be able to understand the critical information infrastructures and the security aspects of important IT services which society depends on. The students will also have gained a particular in-depth understanding of either technology or management issues dependent on their chosen programme track, and scientific depth in a specialized topic through their master thesis.

Målgruppe

There are three focus groups for this study programme:

1. Undergraduate students entering the programme as a continuation of their bachelors degree without any prior work experience.
2. Industry students (or students in private/public sector in general) looking for a full-time or part-time masters programme which is flexible and can be adapted to their employers needs and their own individual needs.
3. International students: full-time, part-time or exchange students arriving for only single semesters.

Opptakskrav og rangering

Applicants must have a bachelors degree in computer science or a related subject to qualify for admission. The applicants must document that they have at least 10 ECTS credits in

mathematics/statistics and at least 60 ECTS credits in computer science subjects. A grade point average (GPA) of C is required. It is expected that within these credits the following topics have been covered:

- Structural and object-oriented programming
- Algorithms and data structures
- Databases and XML
- Software engineering
- Computer network (Data communication)
- Operating systems and computer architecture

Students who have not had a dedicated course in each of these topics need to be prepared for a little bit of extra studying when entering topics that require background knowledge with which they are not sufficiently familiar beforehand.

Graduate studies in information security require a somewhat different mathematical platform than the one included in most bachelor studies. To master the theoretical topics included in the masters programme we therefore recommend that the students attend the preparatory courses in number theory and theoretical computer science offered during the first weeks of the fall semester.

Studiets innhold, oppbygging og sammensetning

The programme is offered in a flexible manner to fit well to all the three target groups of students. In general, on campus presence is *required* only three times per semester (1-3 days each time), for a start-up session, for mid-term exams/presentations (and a start-up session of second part of the semester) and for final exams/presentations. Attendance is also strongly recommended for the *initial first two weeks of the programme when two preparatory intense short-courses in number theory and theoretical computer science are offered*. All courses are available online, but there will also be sessions on a regular weekly or bi-weekly schedule. The presence on these sessions is not required.

More details for the upcoming year of study will be given here: [link to hig/imt/master](#)

The program has two tracks (paths of study): management and technology. Students have to choose which track they pursue when entering the programme. Common to both tracks are a set of courses covering the core topics in both information security technology and management: introduction to cryptology, applied information security, network security, IT governance, information society and security, and legal aspects of information security. In addition, each track has a set of specific courses and the students have to choose at least 15 credits of courses from the track-specific pool of electives. Students also have to choose their master thesis topic within their chosen track.

Ordinary mandatory courses from the other track of the programme and courses from the masters programme in media technology and the CIMET (Color in Informatics and Media Technology) master can be included as electives. Students can also use *up to 20 ECTS of courses at the 3000 level* as part of their masters programme, and are particularly encouraged to browse the course offerings of the bachelor programmes in network and system administration, software engineering, and economics and management. Some of the courses listed above can also be mobile in time, space and teaching format upon request by students (typically a course can be taken in a different semester through self-study and individual or group supervision).

Master-level courses from other institutions can be included as electives or can substitute for mandatory courses at the discretion of the programme director.

The course structure for part-time students can be composed individually as long the track-specific requirements mentioned above and any course interdependencies are respected. The most important course interdependencies are the following: 1. Students should enter their master thesis in the semester following the research project planning course, 2. All previous course work have to be completed before entering the master thesis (an exception of 10 credits missing can be made at the discretion of the master thesis instructor, but only if the missing credits are not relevant for the topic of the master thesis).

Students entering the programme from the bachelors programme in information security will be offered greater flexibility in the course structure due to potential overlap with some of the contents in the bachelors programme.

Study methods

- Lectures
- Exercises
- Project work
- Essay/Article writing
- Independent study
- Group exercises
- Lab exercises

Tekniske forutsetninger

Students who choose to participate in the study program on distance, need a relatively new computer and a broadband Internet connection. Software that is needed is mostly freely available on the Internet. In some courses commercial products, such as MatLab, are required.

For practical computer skills, it is expected that students can use any common operating system (MacOS, Solaris, GNU/Linux or Microsoft Windows) both with a graphical user interface and a command line interface.

Students who have not had a dedicated course on each of these topics should not worry, they just need to be prepared for a little bit of extra studying when entering topics that require background knowledge with which they are not sufficiently familiar beforehand.

Graduate studies in information security requires a somewhat different mathematical platform than the one included in most bachelor studies. To master the theoretical topics included in the masters programme we therefore recommend that you attend the preparatory courses in number theory and theoretical computer science offered during the first two weeks of the fall semester.

Sensorordning

Most courses have internal examiner. The master thesis always has an external examiner.

Internasjonalisering

Students can travel abroad to do their master thesis. The information security group has strong links to many of the leading international academic groups within the field, and students are encouraged to contact their instructor in the course «research project planning» to ask for relevant travel opportunities.

Klar for publisering

Ja

Utdanningsnivå

Mastergrad

Master of Science in Information Security 2009-2011 Technology full-time track

Emnekode	Emnets navn	O/V *)	Studiepoeng pr. semester			
			S1(H)	S2(V)	S3(H)	S4(V)
IMT4421	<u>Vitenskapelige metoder</u>	O	5			
IMT4541	<u>Foundations of Information Security</u>	O	5			
IMT4561	<u>Applied Information Security</u>	O	5			
IMT4531	<u>Introduction to Cryptology</u>	O	5			
IMT4571	<u>IT Governance</u>	O	5			
IMT4551	<u>Selected Topics in Cryptology</u>	O	5			
IMT4581	<u>Nettverkssikkerhet</u>	O		10		
IMT4591	<u>Rettslige aspekter ved informasjonssikkerhet</u>	O		5		
IMT4481	<u>Information Society and Security</u>	O		5		
	<u>Valgemne, 5 st.p.</u>	V		5		
	<u>Valgemne, 5 st.p.</u>	V		5		
IMT4601	<u>Research Project Planning</u>	O				5
	<u>Valgemne, 5 st.p.</u>	V				5
	<u>Valgemne, 5 st.p.</u>	V				5
	<u>Valgemne, 5 st.p.</u>	V				5
	<u>Valgemne, 5 st.p.</u>	V				5
	<u>Valgemne, 5 st.p.</u>	V				5
IMT4901	<u>Masteroppgave</u>	O				30
		Sum:	30	30	30	30

*) O - Obligatorisk emne, V - Valgbare emne

Master of Science in Information Security 2009-2011 Management full-time track

Emnekode	Emnets navn	O/V *)	Studiepoeng pr. semester			
			S1(H)	S2(V)	S3(H)	S4(V)
IMT4561	<u>Applied Information Security</u>	O	5			
IMT4661	<u>Security Management Dynamics</u>	O	5			
IMT4421	<u>Vitenskapelige metoder</u>	O	5			
IMT4531	<u>Introduction to Cryptology</u>	O	5			
IMT4651	<u>Security as Continuous Improvement</u>	O	5			
IMT4571	<u>IT Governance</u>	O	5			
IMT4841	<u>Security Planning and Incident Management</u>	O		10		
IMT4581	<u>Nettverkssikkerhet</u>	O		10		
IMT4481	<u>Information Society and Security</u>	O		5		
IMT4591	<u>Rettslige aspekter ved informasjonssikkerhet</u>	O		5		
IMT4601	<u>Research Project Planning</u>	O				5
	<u>Valgemne, 5 st.p.</u>	V				5
	<u>Valgemne, 5 st.p.</u>	V				5
	<u>Valgemne, 5 st.p.</u>	V				5
	<u>Valgemne, 5 st.p.</u>	V				5
	<u>Valgemne, 5 st.p.</u>	V				5
IMT4901	<u>Masteroppgave</u>	O				30
		Sum:	30	30	30	30

*) O - Obligatorisk emne, V - Valgbare emne

Master of Science in Information Security 2009-2012 Technology part-time track (three years)

Emnekode	Emnets navn	O/V *)	Studiepoeng pr. semester					
			S1(H)	S2(V)	S3(H)	S4(V)	S5(H)	S6(V)
IMT4531	<u>Introduction to Cryptology</u>	O	5					
IMT4551	<u>Selected Topics in Cryptology</u>	O	5					
IMT4421	<u>Vitenskapelige metoder</u>	O	5					
IMT4571	<u>IT Governance</u>	O	5					
IMT4591	<u>Rettslige aspekter ved informasjonssikkerhet</u>	O		5				
IMT4481	<u>Information Society and Security</u>	O		5				
IMT4581	<u>Nettverkssikkerhet</u>	O		10				
IMT4601	<u>Research Project Planning</u>	O			5			
IMT4541	<u>Foundations of Information Security</u>	O			5			
IMT4561	<u>Applied Information Security</u>	O			5			
	<u>Valgemne, 5 st.p.</u>	V			5			
	<u>Valgemne, 5 st.p.</u>	V				5		
	<u>Valgemne, 5 st.p.</u>	V				5		
	<u>Valgemne, 5 st.p.</u>	V				5		
	<u>Valgemne, 5 st.p.</u>	V				5		
	<u>Valgemne, 5 st.p.</u>	V					5	
	<u>Valgemne, 5 st.p.</u>	V					5	
IMT4901	<u>Masteroppgave</u>	O					10	20
		Sum:	20	20	20	20	20	20

*) O - Obligatorisk emne, V - Valgbare emne

Master of Science in Information Security 2009-2012 Management part-time track (three years)

Emnekode	Emnets navn	O/V *)	Studiepoeng pr. semester					
			S1(H)	S2(V)	S3(H)	S4(V)	S5(H)	S6(V)
IMT4651	<u>Security as Continuous Improvement</u>	O	5					
IMT4421	<u>Vitenskapelige metoder</u>	O	5					
IMT4661	<u>Security Management Dynamics</u>	O	5					
IMT4571	<u>IT Governance</u>	O	5					
IMT4841	<u>Security Planning and Incident Management</u>	O		10				
IMT4481	<u>Information Society and Security</u>	O		5				
IMT4591	<u>Rettslige aspekter ved informasjonssikkerhet</u>	O		5				
IMT4531	<u>Introduction to Cryptology</u>	O			5			
IMT4561	<u>Applied Information Security</u>	O			5			
IMT4601	<u>Research Project Planning</u>	O			5			
	<u>Valgemne, 5 st.p.</u>	V			5			
IMT4581	<u>Nettverkssikkerhet</u>	O				10		
	<u>Valgemne, 5 st.p.</u>	V				5		
	<u>Valgemne, 5 st.p.</u>	V				5		
	<u>Valgemne, 5 st.p.</u>	V					5	
	<u>Valgemne, 5 st.p.</u>	V					5	
IMT4901	<u>Masteroppgave</u>	O					10	20
		Sum:	20	20	20	20	20	20

*) O - Obligatorisk emne, V - Valgbare emne

Electives

Emnekode	Emnets navn	O/V *)	Studiepoeng pr. semester	
			S1(H)	S2(V)
IMT4671	<u>Organizational and Human Aspects of Information Security</u>	V	5	
IMT3491	<u>Ethical Hacking and Penetration Testing</u>	V	5	
IMT4632	<u>Machine Learning and Pattern Recognition II</u>	V	5	
IMT3551	<u>Digital Forensics</u>	V	5	
IMT4882	<u>Fordypningsemne II</u>	V	10	10
IMT3761	<u>Informasjonskrigføring</u>	V	5	
IMT4721	<u>Autentisering</u>	V	5	
IMT4741	<u>Intrusion detection and prevention</u>	V	5	
IMT4762	<u>Risk Management I</u>	V	5	
IMT4751	<u>Wireless communication security</u>	V	5	
IMT4772	<u>Risk Management II</u>	V	5	
IMT4881	<u>Fordypningsemne</u>	V	5	5
IMT4641	<u>Computational Forensics</u>	V		5
IMT4612	<u>Machine Learning and Pattern Recognition I</u>	V		5
IMT4621	<u>Biometrics</u>	V		5
IMT3511	<u>Discrete Mathematics</u>	V		10
Sum:			0	0

*) O - Obligatorisk emne, V - Valgbare emne

Emneoversikt

IMT4561 Applied Information Security - 2009-2010

Emnekode:

IMT4561

Emnenavn:

Applied Information Security

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Andre halvdel av semesteret

Språk:

Engelsk

Forventet læringsutbytte:

Students who have passed this course should:

- have acquired good knowledge of the common terminology in information security
- have working knowledge of security analysis methods
- have a good understanding of selected attack mechanisms and techniques and their employment by malicious software
- have working knowledge of database security
- have good understanding of design principles for secure information systems

Emnets temaer:

- Core terminology for information security
- Authentication and authentication techniques
- Security analysis methods
- Design principles for secure information systems
- Case studies of secure system design
- Database security
- Attack mechanisms and techniques
- Malicious software

Pedagogiske metoder:

Forelesninger
Oppgaveløsning
Prosjektarbeid
Annet

Pedagogiske metoder (fritekst):

Annet - Tutorials

Vurderingsformer:

Annet

Vurderingsformer:

Written examination (2/3) in conjunction with term paper (1/3). Pass decision is on the cumulative grade.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by the lecturer.

Utsatt eksamen (tidl. kontinuasjon):

A new term paper must be provided next autumn. For the exam: Ordinary re-sit examination.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Approved calculator

Obligatoriske arbeidskrav:

None.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Stephen Wolthusen

Læremidler:

Books:

- M. Bishop: Computer Security: Art and Science. Addison-Wesley, Reading, MA, USA (2002)
- D. Gollmann: Computer Security, 2nd ed. John Wiley & Sons, New York, NY, USA (2006)
- M. Gasser: Building a Secure Computer System. Van Nostrand Reinhold, New York, NY, USA (1988)
- R. Anderson: Security Engineering: A Guide to Building Dependable Distributed Systems. John Wiley & Sons, Chichester, UK (2001)
- A. K. Jain, P. J. Flynn, and A. A. Ross: Handbook of Biometrics. Springer-Verlag, Berlin, Germany (2007).

Erstatter:

IMT4162 Information Security and Security Architecture

Klar for publisering:

Ja

IMT4661 Security Management Dynamics - 2009-2010

Emnekode:

IMT4661

Emnenavn:

Security Management Dynamics

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Første halvdel av semesteret

Språk:

Engelsk

Forventet læringsutbytte:

The emphasis of this course is on the *dynamics* of security management. This is a much neglected aspect that it is becoming increasingly important.

Security is a highly interdisciplinary challenge, involving Man, Technology and Organization – the famous MTO challenge. Some people would add Economics as a new and important aspect.

Addressing the dynamics of security management provides several bonuses:

- Understand why many managers fail to achieve a satisfactory state of security;
- understand why some important security failures occur as unintended side-effects of management actions;
- and others, such as the increasing importance of employing System Dynamics to manage dynamic complexity.

Emnets temaer:

Foundations – Security standards from the perspective of change and dynamics

Introduction to qualitative system dynamics: Causal loop diagrams; System archetypes

Modelling security management dynamics using system archetypes and causal loop diagrams

Introduction to quantitative system dynamics: Causal structure and dynamic behaviour. Introduction to stocks and flows. Time delays.

Basic system dynamics models of security management.

Pedagogiske metoder:

Forelesninger
Oppgaveløsning
Prosjektarbeid

Pedagogiske metoder (fritekst):

Web-enabled course with forum

Vurderingsformer:

Flervalgstest(er)
Vurdering av prosjekt(er)

Vurderingsformer:

Two multiple choice exams counting each 15%

Two individual projects (papers) counting each 35%

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by the lecturer

Utsatt eksamen (tidl. kontinuasjon):

The whole subject must be repeated.

Tillatte hjelpemidler:**Obligatoriske arbeidskrav:**

The course requires active participation in projects – both in class and outside class.

Hands-on modelling exercises during class are best carried out in computer lab.

Students are encouraged to bring laptops to the classroom.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Jose Gonzalez

Læremidler:

Literature:

Maani, Kambiz E.; Cavana, Robert Y. Systems Thinking And Modelling. Pearson Education. 9781877371035.

Lectures, exercises and projects by Jose J. Gonzalez in Classfronter

Erstatter:

IMT4111 Sikkerhetsledelse

Klar for publisering:

Ja

IMT4421 Vitenskapelige metoder - 2009-2010

Emnekode:

IMT4421

Emnenavn:

Vitenskapelige metoder

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Språk:

Engelsk

Forventet læringsutbytte:

Etter endt emne skal studenten kjenne til og kunne drøfte sentrale spørsmål og problemstillinger innen vitenskapsteori. Studenten skal etter endt emne være i stand til å definere en vitenskapelig problemstilling, kunne planlegge gjennomføringen av et vitenskapelig arbeid og kunne rapportere resultater fra vitenskapelige prosjekter.

Emnets temaer:

- Introduksjon til vitenskapsteori
- Hva kjennetegner god forskning
- Forskningsetikk
- Kvantitative og kvalitative forskningsdesign
- Hva karakteriserer gode problemstillinger og hvordan lager man en?
- Litteraturstudier
- Metodevalg, inkludert planlegging, gjennomføring, og analyse av eksperimenter/studier.
- Behandling av data/statistikk
- Utarbeidelse av prosjektplan
- Gjennomføring av risikoanalyse og gjennomførbarhetsanalyse
- Tekniske rapporter, oppbygging og innhold

Pedagogiske metoder:

Essay
Forelesninger
Nettbasert Læring
Prosjektarbeid
Veiledning

Vurderingsformer:

Skriftlig eksamen, 3 timer

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Intern og ekstern sensor.

Utsatt eksamen (tidl. kontinuasjon):

Ordinær kontinuasjoneksamen.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Engelsk ordbok.

Obligatoriske arbeidskrav:

Godkjent essay

Gjennomført praktisk prosjekt

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Førstelektor Frode Volden

Læremidler:

Leedy, P D, and Ormrod, J E: "Practical Research, -Planning and design, 8th ed." Pearsopn Educational Int. ISBN: 0-13-124720-4

Samt tilleggs litteratur, utdelt eller gjort tilgjengelig i ClassFronter.

Klar for publisering:

Ja

Emneside (URL):

<http://www.hig.no/imt/mt/emnesider/imt4421>

IMT4531 Introduction to Cryptology - 2009-2010

Emnekode:

IMT4531

Emnenavn:

Introduction to Cryptology

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Første halvdel av semesteret

Språk:

Engelsk

Forventet læringsutbytte:

After the course the students should acquire:

- Advanced level of understanding of methods of analysis and synthesis of cryptographic systems
- Deep understanding of modern cryptographic theory

Emnets temaer:

1. Classical cryptography
2. Symmetric ciphers
3. Asymmetric ciphers
4. Hash functions and digital signatures.

Pedagogiske metoder:

Forelesninger
Oppgaveløsning

Vurderingsformer:

Skriftlig eksamen, 3 timer

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by the lecturers

Utsatt eksamen (tidl. kontinuasjon):

Ordinary re-sit examination.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Calculator, dictionary

Obligatoriske arbeidskrav:

None

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Slobodan Petrovic

Læremidler:

Books:

1. Introduction to Cryptography and Coding Theory, 2. edition, Trappe W., Washington L., Prentice Hall, 2006, ISBN: 0131981994.

2. Handbook of Applied Cryptography, Menezes A., <http://www.cacr.math.uwaterloo.ca/hac>

Erstatter:

IMT3701 Cryptology

Supplerende opplysninger:

There is room for 50 students for the course.

Klar for publisering:

Ja

Emneside (URL):

<http://www.hig.no/imt/is/courses/imt4531>

IMT4651 Security as Continuous Improvement - 2009-2010

Emnekode:

IMT4651

Emnenavn:

Security as Continuous Improvement

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Andre halvdel av semesteret

Språk:

Engelsk

Forutsetter bestått:

IMT4661 - Security Management Dynamics

Forventet læringsutbytte:

Already the BS7799/ISO17799 standards encouraged viewing security as quality improvement. Some years later and after the extensions to the ISO27000 family, security as a continuous improvement process is not yet a mainstream activity.

The emphasis of this course is on identifying the systemic obstacles in the implementation path of continuous improvement of processes (“the quality improvement paradox”). Then, to apply this insights to redesign security management to achieve continuous improvement.

Emnets temaer:

The quality improvement paradox

Security and quality improvement processes

Improving the Performance of Computer Security Incident Response Teams (CSIRTs)

Incident reporting systems and Learning from incidents

Security risks in the transition to Integrated Operations

Security-dependent safety. Continuous improvement of security in Critical Infrastructure

Pedagogiske metoder:

Forelesninger
Oppgaveløsning
Prosjektarbeid

Pedagogiske metoder (fritekst):

Web-enabled course with forum

Vurderingsformer:

Flervalgstest(er)
Vurdering av prosjekt(er)

Vurderingsformer:

Two multiple choice exams counting each 15%

Two individual projects (papers) counting each 35%

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by the lecturer

Utsatt eksamen (tidl. kontinuasjon):

The whole subject must be repeated

Tillatte hjelpemidler:**Obligatoriske arbeidskrav:**

The course requires active participation in projects – both in class and outside class.

Hands-on modelling exercises during class are best carried out in computer lab.

Students are encouraged to bring laptops to the classroom.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Jose Gonzalez

Læremidler:

Written material will be given/sent to the students during the semester.

Klar for publisering:

Ja

IMT4571 IT Governance - 2009-2010

Emnekode:

IMT4571

Emnenavn:

IT Governance

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Andre halvdel av semesteret

Språk:

Engelsk

Forventet læringsutbytte:

Calder and Watkins define IT Governance as "the framework for the leadership, organizational structures and business processes, standards and compliance to these standards, which ensures that the organization's information systems support and enable the achievement of its strategies and objectives". IT Governance is of crucial importance for organizations owing to the need to best safeguard critical information and, through the increasing requirements from national and international regulations. Central to IT Governance in Europe is the ISO 27001 / ISO 27002 standard.

This course provides an overview of IT Governance and the basic concepts of the ISO 27001 / ISO 27002 standard.

The candidate should after attending the course

- fully understand the main principles of IT Governance.
- fully understand the basic concepts of the ISO 27001 / ISO 27002 standard
- master the principles for designing & implementing an ISO 27001 ISMS
- be fully aware of the difference between security technology and the management of secure systems
- have a thorough understanding of security management as a continuous improvement process.
- possess awareness of security certification schemes (BS7799, ISO 15408, ...)

Emnets temaer:

- Reasons for IT Governance: Compliance, liability, stability
- Organizing information security
- Information security policy and scope
- The risk assessment and statement of applicability
- Identification of risks related to external parties
- Asset management
- Human resources security
- Physical and environmental security
- Equipment security
- Communications and operations management
- Controls against malicious software (malware) and back-ups
- Network security management and media handling
- Exchanges of information
- Electronic commerce services
- E-mail and internet use
- Access control
- Network access control
- Operating system access control
- Application access control and teleworking
- Systems acquisition, development and maintenance
- Cryptographic controls
- Security in development and support processes
- Monitoring and information security incident management
- Business continuity management
- Compliance
- Principles of auditing

Pedagogiske metoder:

Annet

Pedagogiske metoder (fritekst):

Lectures, exercises and projects.

Vurderingsformer:

Annet

Vurderingsformer:

- 1-2 Multiple Choice Tests (weight: 20%)
- 1-2 group Assignments (weight: 30%)
- Written Final exam (weight: 50%)
- All three parts are mandatory and must be passed!

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by the lecturer

Utsatt eksamen (tidl. kontinuasjon):

For the final exam: Ordinary re-sit examination.

Tillatte hjelpemidler:**Obligatoriske arbeidskrav:**

None.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Forskningssjef Åsmund Skomedal

Læremidler:

Literature:

Alan Calder & Steve Watkins. IT Governance : IT Governance: A Manager's Guide to Data Security and ISO 27001 / ISO 27002. Fourth Edition. Kogan Page. 2008.

Anderson, Ross (1999) Why cryptosystems fail, University Computer Laboratory, University of Cambridge, Cambridge, UK, <http://www.cl.cam.ac.uk/~rja14/wcf.html>.

Klar for publisering:

Ja

IMT4841 Security Planning and Incident Management - 2009-2010

Emnekode:

IMT4841

Emnenavn:

Security Planning and Incident Management

Faglig nivå:

Master (syklus 2)

Studiepoeng:

10

Varighet:

Vår

Språk:

Norsk, alternativt engelsk

Forventet læringsutbytte:

Studenten skal etter endt emne være i stand til å utarbeide policier og prosedyrer for beredskapsplaner, samt lede planleggingsprosessen. Studenten må derfor oppnå god forståelse av hvorfor hendelsesrapporteringssystemer bør være på plass, hvordan de fungerer og hvordan man planlegger og gjennomfører etterforskning. Videre bør studenten ha god oversikt over kjente problemer innen hendelsesrapporteringssystemer. Studenten bør også være i stand til å planlegge for og håndtere større og mindre katastrofer. I forbindelse med katastrofer må studenten også ha oversikt over hvordan man planlegger for å holde driften i gang.

Emnets temaer:

1. Introduction and Overview of Contingency Planning
2. Planning for Organizational Readiness: Risk management, limits to risk management, incident reporting systems, business impact analysis
3. Incident Response: Preparation, organization, prevention, detection, notification, reaction, recovery, maintenance, operational problems for CSIRTS and organizational models for CSIRTS
4. Disaster Recovery: Preparation, implementation, operation and maintenance
5. Business Continuity: Preparation, implementation, operations and Maintenance
6. Crisis Management and Human Factors

Pedagogiske metoder:

Forelesninger

Prosjektarbeid

Vurderingsformer:

Skriftlig eksamen, 3 timer

Vurdering av prosjekt(er)

Vurderingsformer:

Totalvurdering bestående av 100 poeng hvorav 50 poeng kan oppnåes på prosjektarbeide og 50 poeng (minst 18 MÅ oppnås) på avsluttende 3-timers eksamen. Omregning fra 100-poengskala til A-F-skala skjer i henhold til anbefalt omregningstabell, men emneansvarlig kan i spesielle tilfeller gjøre små justeringer av grenser for å sikre overenstemmelse med de kvalitative beskrivelsene på A-F-skalaen.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Emnelærer sensurerer.

Utsatt eksamen (tidl. kontinuasjon):

Ordinær kontinuasjon på skriftlig eksamen

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Orbok: Engelsk-Norsk eller Engelsk til annet språk

Obligatoriske arbeidskrav:

Et prosjekt må gjennomføres (eksamensprosjektet).

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Finn Olav Sveen

Læremidler:

Michael Whitman og Herbert Mattord: Principles of Incident Response and Disaster Recovery. Thomson, 2007.

Tillegglitteratur vil bli utdelt.

Erstatter:

IMT5161 - Incident response and computer forensics

Klar for publisering:

Ja

IMT4581 Nettverkssikkerhet - 2009-2010

Emnekode:

IMT4581

Emnenavn:

Nettverkssikkerhet

Faglig nivå:

Master (syklus 2)

Studiepoeng:

10

Varighet:

Vår

Språk:

Engelsk

Anbefalt forkunnskap:

Noe kjennskap til kryptologi

Forventet læringsutbytte:

Se engelsk versjon

Emnets temaer:

Se engelsk versjon

Pedagogiske metoder:

Essay

Forelesninger

Vurderingsformer:

Annet

Vurderingsformer:

Totalvurdering bestående av 100 poeng hvorav 50 poeng kan oppnåes på essay og 50 poeng på skriftlig eksamen. Omregning fra 100-poengskala til A-F-skala skjer i henhold til anbefalt omregningstabell, men emneansvarlig kan i spesielle tilfeller gjøre små justeringer av grenser for å sikre overenstemmelse med de kvalitative beskrivelsene på A-F-skalaen.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Intern sensor

Utsatt eksamen (tidl. kontinuasjon):

Ordinær kontinuasjon på skriftlig eksamen

Tillatte hjelpemidler:

Tillatte hjelpemidler (gjelder kun skriftlig eksamen):

Ingen

Obligatoriske arbeidskrav:

Ingen

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor II Jan Audestad

Læremidler:

Kompendium forfattet av emneansvarlig, tilgjengelig via Fronter.

Erstatter:

IMT4101 Sikkerhet i distribuerte systemer

Supplerende opplysninger:

Emnet har plass til max. 50 studenter

Klar for publisering:

Ja

IMT4481 Information Society and Security - 2009-2010

Emnekode:

IMT4481

Emnenavn:

Information Society and Security

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Vår

Varighet (fritekst):

Første halvdel av semesteret.

Språk:

Engelsk

Forventet læringsutbytte:

Studentene skal primært forstå hvorfor utviklingen de siste ti årene innen IKT har ført til et meget sårbart samfunn og hva denne sårbarheten består i. De skal få nok forståelse i emnet til at de kan identifisere, vurdere verdien av og iverksette tiltak til beskyttelse av bedrifter og foretak.

Dette omfatter forståelse for:

- hvordan IKT-systemer er bygget opp og inngår i industriell produksjon, i offentlig og privat tjenesteyting, i offentlig administrasjon og i samfunnets infrastruktur
- hvorfor IKT-systemer og administrativ infrastruktur kan beskrives som skalafrie nettverk, og hva dette har å si for sårbarhet og robusthet
- klassisk pålitelighetsteori, inklusivt pålitelighet av programvare og nettverk.

Emnets temaer:

- Innføring i begrepet risiko slik det er brukt i teknologi, forsikring og finans.
- Årsaker som bidrar til øket risiko: overoptimistisk fokus på markedsvekst, manglende tallforståelse og innsikt i statistikk og sannsynlighetsregning og teoriene til Kahneman og Tversky (forankring og prospektteori).
- Oppbygning og virkemåte av distribuerte IKT-systemer, herunder telekommunikasjonsteknologi og distribuert prosessering.
- Klassisk pålitelighetsteori for maskinvare og programvare.
- Teorien for tilfeldige (random) grafer (nettverk) og deres egenskaper med særlig vekt på egenskapene til skalafrie grafer.
- Sentrale begreper fra kombinatorisk kompleksitet og beregnbarhet gjennomgås.
- Identifisering av skalafrie nettverk i samfunnet (tekniske, administrative og sosiale) og deres betydning for samfunnets sårbarhet.

Pedagogiske metoder:

Forelesninger

Vurderingsformer:

Skriftlig eksamen, 3 timer

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Rettes av emnelærer(e)

Utsatt eksamen (tidl. kontinuasjon):

Ordinær kontinuasjon

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Ingen

Obligatoriske arbeidskrav:

Ingen

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Jan Arild Audestad

Læremidler:

Jan A Audestad, *E-Bombs and E-Grenades: The Vulnerability of the Computerized Society*, HiG, 2009
(tilgjengelig via Fronter)

-Utdelte artikler

Erstatter:

IMT4151 - Samfunnets sårbarhet

Klar for publisering:

Ja

IMT4591 Rettslige aspekter ved informasjonssikkerhet - 2009-2010

Emnekode:

IMT4591

Emnenavn:

Rettslige aspekter ved informasjonssikkerhet

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Vår

Varighet (fritekst):

Andre halvdel av semesteret

Språk:

Norsk, alternativt engelsk

Forventet læringsutbytte:

Etter fullført emne skal studentene være i stand til å redegjøre for rettslige forhold som er særlig relevante for arbeidet med informasjonssikkerhet. Dette gjelder spesielt den rettslige reguleringen av forhold som har betydning for ivaretagelse av konfidensialitet, integritet, tilgjengelighet og kvalitet.

Emnets temaer:

Allment om rettssikkerhet og informasjonsfrihet
Oversikt over rettslige spørsmål knyttet til systemutvikling
Personvern
Sikkerhetsloven
Datakriminalitet
Elektroniske signaturer
Elektronisk samhandling med forvaltningen
Informasjonssikkerhet i kredittforetak mv

Pedagogiske metoder:

Forelesninger
Gruppearbeid
Oppgaveløsning

Vurderingsformer:

Skriftlig eksamen, 3 timer

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Intern + ekstern sensor

Utsatt eksamen (tidl. kontinuasjon):

Ordinær kontinuasjon

Tillatte hjelpemidler:**Ansvarlig avdeling:**

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Lise Nilsen

Læremidler:

Se oversikt i emnets rom i Fronter.

Klar for publisering:

Ja

IMT4601 Research Project Planning - 2010-2011

Emnekode:

IMT4601

Emnenavn:

Research Project Planning

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Vår

Språk:

Engelsk

Forutsetter bestått:

IMT 4421 Scientific methodology

Forventet læringsutbytte:

The Pre-project shall prepare the students to complete their master thesis on time, and with the expected quality.

Having completed the course, the students should have acquired:

- An understanding of academic writing style and documentation structure.
- The ability to formulate a research problem and research questions.
- An understanding of ethical issues in research.

Emnets temaer:

1. Problem description and choice of methods
2. Use of library resources
3. Project planning

Pedagogiske metoder:

Forelesninger

Vurderingsformer:

Vurdering av prosjekt(er)

Vurderingsformer:

Final report counts 100%. Each student must hand in his/her own individual report.

To ensure fairness, course deliverable grading will depend on deliverable quantity, quality and the number of contributing students.

Scores can be normalized at the discretion of the instructor/examiner.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

External and internal examiner on the final report.

Utsatt eksamen (tidl. kontinuasjon):

The whole course must be repeated.

Tillatte hjelpemidler:**Obligatoriske arbeidskrav:**

Gjennomføre 7 veiledningsmøter (gjærne elektronisk for avstandsstudenter) med veileder i løpet av semesteret. Som grunnlag for veiledningsmøtene skal studenten levere statusrapport for sitt prosjekt.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Einar Snekkenes

Klar for publisering:

Ja

Emneside (URL):

<http://www.hig.no/imt/emnesider/imt4601>

Valgemne, 5 st.p. - 2009-2010

Emnenavn:

Valgemne, 5 st.p.

Faglig nivå:

Bachelor (syklus 1)

Studiepoeng:

5

Varighet:

Høst og vår

Språk:

Norsk

Forventet læringsutbytte:

.

Emnets temaer:

.

Pedagogiske metoder:

Gruppearbeid

Vurderingsformer:

Øvinger

Karakterskala:

Bestått/Ikke bestått

Tillatte hjelpemidler:**Ansvarlig avdeling:**

Avdeling for teknologi, økonomi og ledelse

Emneansvarlig:

.

Klar for publisering:

Ja

IMT4901 Masteroppgave - 2010-2011

Emnekode:

IMT4901

Emnenavn:

Masteroppgave

Faglig nivå:

Master (syklus 2)

Studiepoeng:

30

Varighet:

Høst

Vår

Varighet (fritekst):

Se engelsk beskrivelse.

Språk:

Norsk, alternativt engelsk

Forutsetter bestått:

Se engelsk beskrivelse.

Forventet læringsutbytte:

Se engelsk beskrivelse.

Emnets temaer:

Se engelsk beskrivelse.

Pedagogiske metoder:

Prosjektarbeid

Samling(er)/seminar(er)

Veiledning

Vurderingsformer:

Vurdering av prosjekt(er)

Vurderingsformer:

Se engelsk beskrivelse.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Se engelsk beskrivelse.

Utsatt eksamen (tidl. kontinuasjon):

Se engelsk beskrivelse.

Tillatte hjelpemidler:**Obligatoriske arbeidskrav:**

Se engelsk beskrivelse.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Prodekan/Vicedean Rune Hjelsvold

Klar for publisering:

Ja

Emneside (URL):

<http://www.hig.no/imt/emnesider/imt4901>

IMT4671 Organizational and Human Aspects of Information Security - 2011-2012

Emnekode:

IMT4671

Emnenavn:

Organizational and Human Aspects of Information Security

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

First half of semester

Språk:

Engelsk

Anbefalt forkunnskap:

Basic understanding of risk analysis and risk assessment. Basic knowledge in technical configuration of security devices such as firewall, IDS, IAM etc.

Forventet læringsutbytte:

In general, this course gives a very practical view of the main task of a corporate security office. The experience of the security office of more than five fortune 500 enterprises is woven in the content and exercises and project work. The influence of the corporate security office on security implementation and configuration will be studied using typical real situations.

Having completed the course, the student should have

- A sound understanding of corporate organisations and policies, and how the security is embedded into organisation, processes and corporate documentation framework. He/she will be able to plan the set of required security documentations and to implement enterprise specific security organisation and security policies
- an understanding practical awareness and the ability to plan a corporate awareness campaign
- an understanding of security culture and its meaning. The student will be enabled to describe a target security culture and to make an implementation plan for a turn around
- the ability to distinguish between responsibility and delegation. The student will be enabled to provide security in an unfriendly environment with budget constraints and “lack of enthusiasm” for security.
- an understanding of security strategy, security innovation process and its implementation.
- an understanding of future research topic identification and its processes as implemented in European Commission (www.parsicfalproject.eu www.ci2rco.org)

Emnets temaer:

The course will cover a selection the following or similar topics

- overview of practical information security management with special focus on human and organisational aspects
- case studies of practical information security policy, strategy, culture, organisation
- defining the various key roles in corporate security management and how they interact
- planning of key elements of corporate security framework
- Security innovation process in enterprises and research.

Pedagogiske metoder:

Annet

Pedagogiske metoder (fritekst):

Lectures, seminars or guided self study, role games, project work, depending on the number of students: Term paper(s)

Vurderingsformer:

Muntlig, individuelt

Annet

Vurderingsformer:

- Oral examination: for 20-25 minutes, if the number of students is too big, it will be turned to a written exam: (65%)
- Term paper(s): (35%)
- Pass decision is on the cumulative grade.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by the lecturer

Utsatt eksamen (tidl. kontinuasjon):

A new term paper must be provided and the examination must be re-sat.

Tillatte hjelpemidler:**Obligatoriske arbeidskrav:**

Two presentation in respect to the term paper will take place during the semester:

- In the second week each students presents a concept of the term paper (content), the methodical approach and the resources which will be used during work. Presentation lasts 5 Minutes. Each student will receive comments from the class and the teacher.
- In the last lectures of the Semester a presentation of the term paper (about 30 minutes) as a coaching for a mini presentation at the oral exam is given by the students.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Prof. Bernhard Hammerli

Læremidler:

TBA

Supplerende opplysninger:

In case there will be less than 5 students that will apply for the course, it will be at the discretion of Studieprogramansvarlig whether the course will be offered or not and if yes, in which form.

Klar for publisering:

Ja

IMT3491 Ethical Hacking and Penetration Testing - 2011-2012

Emnekode:

IMT3491

Emnenavn:

Ethical Hacking and Penetration Testing

Faglig nivå:

Bachelor (syklus 1)

Studiepoeng:

5

Varighet:

Høst

Språk:

Engelsk

Anbefalt forkunnskap:

IMT2282 Operating systems

Forventet læringsutbytte:

The course will address the methodology of penetration testing, learning how penetration tests are constructed and experimenting with penetration testing tools in the laboratory. The course will look at vulnerabilities in software both at server and client side, with a high focus on network applications.

The students should after the end of the course have a good overview of how an effective penetration test should take place and of the threats that exists towards software, networks, and network services. A deeper analysis and a set of practical exercises will be the foundation for a deeper understanding into some specific security vulnerabilities that exists.

Emnets temaer:

- Ethical Hacking and Penetration Testing – definitions
- Penetration Testingx" Methodologies
- Password attacks
- Privilege escalation
- Network mapping
- Software vulnerabilities
- Web application problems
- XSS, parameters, persistence
- SQLinjection
- Data mining
- Fuzzing

Pedagogiske metoder:

Forelesninger
Gruppearbeid
Lab.øvelser
Oppgaveløsning

Vurderingsformer:

Skriftlig eksamen, 2 timer
Vurdering av prosjekt(er)

Vurderingsformer:

- Written exam (51%), depending on the number of student the exam might be oral
- Project (49%)
- Both parts must be passed

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluation by internal and external examiner

Utsatt eksamen (tidl. kontinuasjon):

- Ordinary re-sit examination
- New project(s) at next course dates

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

None

Obligatoriske arbeidskrav:

2 approved exercises

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Førsteamanuensis Lasse Øverlier

Læremidler:

Articles and book chapters. Specifics to be announced at course start.

Supplerende opplysninger:

In case there will be less than 5 students that will apply for the course, it will be at the discretion of Studieprogramansvarlig whether the course will be offered or not and if yes, in which form.

Klar for publisering:

Ja

IMT4632 Machine Learning and Pattern Recognition II - 2011-2012

Emnekode:

IMT4632

Emnenavn:

Machine Learning and Pattern Recognition II

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Første halvdel av semesteret

Språk:

Engelsk

Forutsetter bestått:

IMT4612 Machine Learning and Pattern Recognition I

Forventet læringsutbytte:

Se engelsk versjon

Emnets temaer:

Se engelsk versjon

Pedagogiske metoder:

Forelesninger

Gruppearbeid

Lab.øvelser

Oppgaveløsning

Annet

Pedagogiske metoder (fritekst):

Se engelsk versjon

Vurderingsformer:

Skriftlig eksamen, 3 timer

Annet

Vurderingsformer:

Se engelsk versjon

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Se engelsk versjon

Utsatt eksamen (tidl. kontinuasjon):

Se engelsk versjon

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Se engelsk versjon

Obligatoriske arbeidskrav:

None.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Katrin Franke

Læremidler:

Se engelsk versjon

Supplerende opplysninger:

Se engelsk versjon

Klar for publisering:

Ja

IMT3551 Digital Forensics - 2011-2012

Emnekode:

IMT3551

Emnenavn:

Digital Forensics

Faglig nivå:

Bachelor (syklus 1)

Studiepoeng:

5

Varighet:

Høst

Språk:

Norsk, alternativt engelsk

Anbefalt forkunnskap:

- IMT2282- Operativsystemer
- IMT2431- Datakommunikasjon og nettverkssikkerhet

Forventet læringsutbytte:

Students are able to explain the fundamental principles of digital forensics. The students are able to survey a digital crime scene and to acquire, analyze and present digital evidence in a forensically sound manner.

Emnets temaer:

- Digital investigations and evidence
- Chain of custody and forensic soundness
- Timeline analysis
- Live system forensics
- File system forensics
- Forensic reconstructions
- Advanced topics if time permits
 - Internet and network forensics
 - Cybercrime law

Pedagogiske metoder:

Forelesninger

Lab.øvelser

Vurderingsformer:

Annet

Vurderingsformer:

An overall evaluation based on a 100 point scale, where project work counts 40 points, oral presentation counts 20%, and final exam (3 hours) counts 40 points. Conversion from 100 point scale to A-F scale according to recommended conversion table. In specific circumstances, emneansvarlig can slightly adjust the limits in the conversion table to enforce compatibility with the qualitative descriptions on the A-F scale.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Intern og ekstern sensor sensurerer alle besvarelsene

Utsatt eksamen (tidl. kontinuasjon):

Ordinær kontinuasjon på skriftlig eksamen

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Ingen

Obligatoriske arbeidskrav:

Oppgis ved semesterstart

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Associate Professor André Årnes (andre.arnes@hig.no)

Læremidler:

- Dan Farmer and Wietse Venema: Forensic Discovery, Addison-Wesley, 2005
- Presentation material and 5 selected papers

Erstatter:

IMT3711 Digital Forensic Science

Supplerende opplysninger:

Kjennskap til Linux er en fordel

In case there will be less than 5 students that will apply for the course, it will be at the discretion of Studieprogramansvarlig whether the course will be offered or not and if yes, in which form.

Klar for publisering:

Ja

IMT4882 Fordypningsemne II - 2011-2012

Emnekode:

IMT4882

Emnenavn:

Fordypningsemne II

Faglig nivå:

Master (syklus 2)

Studiepoeng:

10

Varighet:

Høst

Vår

Varighet (fritekst):

Can run any time during the full year.

Språk:

Engelsk

Forutsetter bestått:

Must be determined by the supervisor based upon the particular assignment.

Forventet læringsutbytte:

The student will learn how to master a particular topic individually

Emnets temaer:

The student and the supervisor will agree on a topic together. The supervisor is responsible for the fact that the workload for the student should be equivalent to a 10 ECTS course. The student will work as much as possible independently with some supervision by the supervisor.

Pedagogiske metoder:

Annet

Pedagogiske metoder (fritekst):

The teaching methods depend on the particular topic agreed upon by the student and the supervisor

Vurderingsformer:

Vurdering av prosjekt(er)

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Could be both internal and external.

Utsatt eksamen (tidl. kontinuasjon):

The whole course must be repeated.

Tillatte hjelpemidler:**Ansvarlig avdeling:**

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Førsteamanuensis Patrick Bours

Læremidler:

Depending on the particular agreed upon topic

Supplerende opplysninger:

This course is intended for students who want to work independently on a particular topic of his/her interest. The student needs to find a supervisor by him/herself. The supervisor and the student will need to agree on a topic together. Topics can be for example (list is not exclusive):

- * studying a particular topic from literature
- * investigating a particular open research problem
- * performing experiments on a research topic

In general the student will write a report on his studies or findings that can be evaluated either by the supervisor or by an external examiner. Another option for the evaluation could be writing an article for a publication or a presentation at a conference or an oral exam with the supervisor or a third person.

Students are not allowed to take both IMT4881 Specialization course 5 ECTS and IMT4882 Specialization course II 10 ECTS (either IMT4881 or IMT4882).

Klar for publisering:

Ja

IMT3761 Informasjonskrigføring - 2011-2012

Emnekode:

IMT3761

Emnenavn:

Informasjonskrigføring

Faglig nivå:

Bachelor (syklus 1)

Studiepoeng:

5

Varighet:

Høst

Språk:

Norsk

Forventet læringsutbytte:***Kunnskap***

- Forklare hva informasjonskrigføring er
- Formulere hvordan informasjonskrigføring benyttes i krigføring, terrorisme og kriminalitet
- Gjøre rede for hvordan næringsliv og offentlig sektor kan beskytte seg mot informasjonskrigføring

Ferdigheter

- Følge reelle informasjonsoperasjoner
- Avsløre og gjenkjenne forsøk på psykologisk manipulasjon
- Velge indikatorer for å påvise at man er utsatt for informasjonskrigføring
- Planlegge og tilrettelegge for beskyttelse av bedrifter eller organisasjoner mot informasjonskrigføring

Generell kompetanse

- Anerkjenne samfunnets avhengighet av informasjonssystemer og at denne avhengigheten gjennom psykologisk manipulering, etterretning og målrettet ødeleggelse kan brukes til å utøve makt overfor enkeltpersoner, grupper og nasjonalstater
- Ta ansvar for beskyttelse av bedrifter eller organisasjoner i tråd med juridiske føringer

Emnets temaer:

- Informasjonskrigføringens terminologi og innhold
- Cyber space som operasjonsmiljø
- Våpen som brukes i informasjonskrigføring
- Introduksjon til psykologien bak manipulering
- Kunnskapsledelse (knowledge management)
- Verdivurdering
- Kunnskapsbaserte cyber-operasjoner

Pedagogiske metoder:

Forelesninger
Gruppearbeid

Vurderingsformer:

Skriftlig eksamen, 3 timer

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Intern sensor

Utsatt eksamen (tidl. kontinuasjon):

Ordinær kontinuasjon

Tillatte hjelpemidler:**Obligatoriske arbeidskrav:**

Rapporter

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Major Roger Johnsen

Læremidler:

Bøker:

- Global Information Warfare: How Businesses, Governments, and Others Achieve Objectives and Attain Competitive Advantages, Andy Jones / Gerald L. Kovacich / Perry G. Luzwick, Auerbach Pub, utgave 1 (ISBN: 0849311144)
- Påvirkning. Teori og praksis., Robert B. Cialdini, utgave 2003 (ISBN: 82-7935-107-8)

Supplerende opplysninger:

Emnet har plass til max. 30 studenter.

Klar for publisering:

Ja

IMT4721 Autentisering - 2011-2012

Emnekode:

IMT4721

Emnenavn:

Autentisering

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Språk:

Engelsk

Forventet læringsutbytte:

Etter endt emne har studenten økt forståelse av

- ulike autentiseringsmetoder f eks passord/pin, ganglag, signatur, tastetrykk-dynamikk, tokenbaserte løsninger.
- evaluering av autentiseringsmetoder med hensyn til sikkerhetsmessig styrke

Emnets temaer:

- Autentisering i en sikkerhetskontekst. Hva er rimelige antagelser med hensyn på opponentens kapabiliteter.
- Utvalgte autentiseringsteknikker som f eks passord/pin, ganglag, signatur, tastetrykk-dynamikk, tokenbaserte løsninger.
- Teknikker for å evaluere autentiseringsmetoder

Pedagogiske metoder:

Forelesninger

Prosjektarbeid

Veiledning

Vurderingsformer:

Annet

Vurderingsformer:

Totalvurdering bestående av 100 poeng hvorav 50 poeng på prosjektarbeide og 50 poeng på avsluttende eksamen (3 timer). Omregning fra 100-poengskala til A-F-skala skjer i henhold til anbefalt omregningstabell, men emneansvarlig kan i spesielle tilfeller gjøre små justeringer av grenser for å sikre overenstemmelse med de kvalitative beskrivelsene på A-F-skalaen.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Intern sensor.

Utsatt eksamen (tidl. kontinuasjon):

Ordinær kontinuasjon på skriftlig eksamen.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Godkjent kalkulator

Obligatoriske arbeidskrav:

Ingen

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Førsteamanuensis Patrick Bours

Læremidler:

Det eksisterer et kompendium skrevet av professoren som tildeles ved begynnelse av kurset.

Erstatter:

IMT5072 - Autentisering

Supplerende opplysninger:

In case there will be less than 5 students that will apply for the course, it will be at the discretion of Studieprogramansvarlig whether the course will be offered or not and if yes, in which form.

Klar for publisering:

Ja

Emneside (URL):

<http://www.hig.no/imt/is/courses/imt4721>

IMT4741 Intrusion detection and prevention - 2011-2012

Emnekode:

IMT4741

Emnenavn:

Intrusion detection and prevention

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

First half of the autumn semester

Språk:

Engelsk

Forventet læringsutbytte:**Knowledge**

The candidate possesses advanced knowledge in detection and prevention of intrusions in modern computer systems and networks.

The candidate possesses thorough knowledge about theory and scientific methods relevant for intrusion detection.

The candidate is capable of applying his/her knowledge in new fields of intrusion detection and prevention.

Skills

The candidate is capable of analyzing existing theories, methods and interpretations in the field of intrusion detection and working independently on solving theoretical and practical problems.

The candidate can use relevant scientific methods in independent research and development in intrusion detection.

The candidate is capable of performing critical analysis of various literature sources and applying them in structuring and formulating scientific reasoning in the field of intrusion detection and prevention.

The candidate is capable of carrying out an independent limited research or development project in intrusion detection under supervision, following the applicable ethical rules.

General competence

The candidate is capable of analyzing relevant professional and research ethical problems in the field of intrusion detection.

The candidate is capable of applying his/her knowledge and skills in new fields, in order to accomplish advanced tasks and projects.

The candidate can work independently and is familiar with terminology in the field of intrusion detection and prevention.

The candidate is capable of discussing professional problems, analyses and conclusions in the field of intrusion detection and prevention, both with specialists and with general audience.

The candidate is capable of contributing to innovation and innovation processes.

Emnets temaer:

1. Definition and classification of IDS systems
2. Basic elements of attacks against computer networks and their detection
3. Misuse-based IDS
4. Anomaly-based IDS
5. Testing IDS and measuring their performances

Pedagogiske metoder:

Forelesninger
Lab.øvelser
Oppgaveløsning
Prosjektarbeid

Pedagogiske metoder (fritekst):

Lectures

Laboratory exercises

Numerical exercises

Project work

Vurderingsformer:

Skriftlig eksamen, 3 timer
Vurdering av prosjekt(er)

Vurderingsformer:

Written exam, 3 hours (counts 70% of the final mark)

Project evaluation (counts 30% of the final mark)

Both parts must be passed.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by the lecturer

Utsatt eksamen (tidl. kontinuasjon):

Ordinary re-sit examination

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Calculator, dictionary

Obligatoriske arbeidskrav:

None

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Slobodan Petrovic

Læremidler:**Obligatory literature:**

None.

Recommended literature:

1. Rebecca Gurley Bace, Intrusion Detection, Macmillan, 2000.
2. Jack Koziol, Intrusion Detection with SNORT, SAMS, 2003.
3. David J. Marchette, Computer Intrusion Detection and Network Monitoring - A Statistical Viewpoint, Springer Verlag, 2001.
4. Richard Bejtlich, Extrusion Detection - Security Monitoring for Internal Intrusions, Addison-Wesley, 2005.
5. Stephen Northcutt, Judy Novak, Network Intrusion Detection, 3rd edition, New Riders, 2003.

Erstatter:

IMT5151 - Intrusion detection and prevention

Supplerende opplysninger:

In case there will be less than 5 students that will apply for the course, it will be at the discretion of Studieprogramansvarlig whether the course will be offered or not and if yes, in which form.

Klar for publisering:

Ja

Emneside (URL):

<http://www.hig.no/imt/emnesider/imt4741>

IMT4762 Risk Management I - 2011-2012

Emnekode:

IMT4762

Emnenavn:

Risk Management I

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

First part of the semester

Språk:

Engelsk

Forventet læringsutbytte:

Se engelsk versjon

Emnets temaer:

Se engelsk versjon

Pedagogiske metoder:

Forelesninger

Gruppearbeid

Nettstøttet læring

Prosjektarbeid

Samling(er)/seminar(er)

Veiledning

Pedagogiske metoder (fritekst):

Se engelsk versjon

Vurderingsformer:

Muntlig, individuelt

Vurdering av prosjekt(er)

Vurderingsformer:

Se engelsk versjon

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by external and internal examiner.

Utsatt eksamen (tidl. kontinuasjon):

Not allowed.

Tillatte hjelpemidler:**Ansvarlig avdeling:**

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Høgskolelektor Tone Hoddø Bakås

Læremidler:

The course literature will be the documents listed below or similar.

All literature listed below are available from ISACA (www.isaca.org).

ISACA. The Risk IT Framework. 2009. ISBN 978-1-60420-111-6

ISACA. THE RISK IT PRACTITIONER GUIDE. 2009. ISBN 978-1-60420-116-1

Additional recommended reading

IT Governance Institute. COBIT 4.1. 2007.. ISBN 1-933284-72-2

Klar for publisering:

Ja

IMT4751 Wireless communication security - 2011-2012

Emnekode:

IMT4751

Emnenavn:

Wireless communication security

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Second half of the autumn semester

Språk:

Engelsk

Forutsetter bestått:

The student is required to have some knowledge of cryptography equivalent to IMT4532 (Cryptology 1)

Forventet læringsutbytte:**Knowledge**

The candidate possesses advanced knowledge in the field of wireless communication security, which includes the following topics: security in RFID, wireless LAN, Bluetooth, 2G and 3G mobile telephony.

The candidate possesses thorough knowledge about theory and scientific methods relevant for wireless communication security.

The candidate is capable of applying his/her knowledge in new fields of wireless communication security.

Skills

The candidate is capable of analyzing existing theories, methods and interpretations in the field of wireless communication security and working independently on solving theoretical and practical problems.

The candidate can use relevant scientific methods in independent research and development in wireless communication security.

The candidate is capable of performing critical analysis of various literature sources and applying them in structuring and formulating scientific reasoning in the field of wireless communication security.

The candidate is capable of carrying out an independent limited research or development project in wireless communication security under supervision, following the applicable ethical rules.

General competence

The candidate is capable of analyzing relevant professional and research ethical problems in the field of wireless communication security.

The candidate is capable of applying his/her knowledge and skills in new fields, in order to accomplish advanced tasks and projects.

The candidate can work independently and is familiar with terminology in the field of wireless communication security.

The candidate is capable of discussing professional problems, analyses and conclusions in the field of wireless communication security, both with specialists and with general audience.

The candidate is capable of contributing to innovation and innovation processes.

Emnets temaer:

1. Basic radio-frequency communications
2. RFID, Wireless LAN, Bluetooth security
3. Security of 2G mobile telephony systems
4. Security of 3G mobile telephony systems

Pedagogiske metoder:

Forelesninger
Prosjektarbeid

Pedagogiske metoder (fritekst):

Lectures

Project work

Vurderingsformer:

Skriftlig eksamen, 3 timer
Vurdering av prosjekt(er)

Vurderingsformer:

Written exam, 3 hours (counts 70% of the final mark)

Project evaluation (counts 30% of the final mark)

Both parts must be passed.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by the lecturer

Utsatt eksamen (tidl. kontinuasjon):

Ordinary re-sit examination

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Calculator, dictionary

Obligatoriske arbeidskrav:

None

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Slobodan Petrovic

Læremidler:**Books:**

1. Gunter Schafer, Security in Fixed and Wireless Networks: An Introduction to Securing Data Communications, John Wiley & Son Inc. 2003
2. V. Niemi, K. Nyberg, UMTS Security, John Wiley & Sons, 2005

Erstatter:

IMT5171 - Wireless communication security

Supplerende opplysninger:

In case there will be less than 5 students that will apply for the course, it will be at the discretion of Studieprogramansvarlig whether the course will be offered or not and if yes, in which form.

Klar for publisering:

Ja

Emneside (URL):

<http://www.hig.no/imt/emnesider/imt4751>

IMT4772 Risk Management II - 2011-2012

Emnekode:

IMT4772

Emnenavn:

Risk Management II

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Andre halvdel av semesteret

Språk:

Engelsk

Forventet læringsutbytte:

The course contributes towards the following learning outcomes:

Knowledge

- Possesses advanced knowledge within the area covered by the Master Programme.
- Possesses specialized insight and good understanding of the research frontier in a selected part of the topic covered by the Master Programme.

Skills

- Is able to analyze existing theories, methods and interpretations and to challenge established knowledge and practice in the media technology area.
- Is able to use relevant and suitable methods when carrying out research and development activities in the area of media technology
- Is able to plan and complete an independent and limited research or development project with guidance and in adherence to research ethics.

Having completed the course, the students should have:

- advanced level of understanding of assumptions and models on which risk analysis methods are based .
- deep understanding of how different assumptions/models influence outcomes of different risk analysis methods.

Emnets temaer:

- Classifications of Risk Management methods
- Examples of Risk Management Methods.
- Decision theory
- Risk, Threat and vulnerability discovery
- Uncertainty
- Game theory

Pedagogiske metoder:

Forelesninger

Oppgaveløsning

Vurderingsformer:

Annet

Vurderingsformer:

- Written exam 3 hours (alternatively oral exam): 51%
- Projects: 49%.
- Both parts must be passed.

To ensure fairness, course deliverable grading will depend on deliverable quantity, quality and the number of contributing students.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by external and internal examiners.

Utsatt eksamen (tidl. kontinuasjon):

For the written exam: Ordinary re-sit examination.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Approved calculator

Obligatoriske arbeidskrav:

None

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Einar Snekkenes

Læremidler:

Books, articles and WEB resources such as

RA method classification

Douglas J. Landoll. The security risk assessment handbook, p. 8-15. CRC. 2005.

Bornman, G, and Labuschagne, L, 2004, A comparative framework for evaluating information security risk management methods, In proceedings of the Information Security South Africa Conference. 2004, www.infosecsa.co.za

Vorster, A. and Labuschagne, L. 2005. A framework for comparing different information security risk analysis methodologies. In Proceedings of the 2005 Annual Research Conference of the South African institute of Computer Scientists and information Technologists on IT Research in Developing Countries (White River, South Africa, September 20 - 22, 2005). ACM International Conference Proceeding Series, vol. 150. South African Institute for Computer Scientists and Information Technologists, 95-103.

ENISA. Inventory of risk assessment and risk management methods. Deliverable 1, Final version Version 1.0, 0/03/2006

Campbell and Stamp. A classification scheme for Risk Assessment Methods. Sandia Report. SAND2004-4233.

RA method examples

IDART (<http://www.idart.sandia.gov/method.html>)

NIST SP 800-42, p3.1 - 3.21, 4.1- 4.3, C.1-C.9

NIST SP 800-30. p8-27

OECD, "OECD Guidelines for the Security of Information Systems and Networks -- Towards a Culture of Security." Paris: OECD. July 2002. www.oecd.org. P 10-12

ISO/IEC 27005:2008(E) Information technology - Security techniques - Information security risk management

Decision theory

Sven Ove Hansson. Decision Theory - A brief introduction. 2005

http://en.wikipedia.org/wiki/Newcomb%27s_paradox

http://en.wikipedia.org/wiki/St_Petersburg_Paradox

Sven Ove Hansson. Fallacies of Risk

Risk Threat and Vulnerability discovery

ISO 27005, Annex C,D

Ed Yourdon. Just enough Structured Analysis. Chapter 9, Dataflow diagrams. + 'How to'.

The vulnerability assessment and mitigation methodology. Chapter 1-4, p. 1-36. MITRE technical report..

Uncertainty

Lindley, Dennis V. (2006-09-11). Understanding Uncertainty. Wiley-Interscience. ISBN 978-0470043837

H. Campbell. Risk assessment: subjective or objective? Engineering science and education journal, 7:57 -63, 1998.

F. Redmill. Risk analysis-a subjective process? Engineering Management Journal. Apr 2002. Volume: 12, Issue: 2. p. 91-96

Game theory

Stanford Encyclopedia of Philosophy . Game theory. Available from <http://plato.stanford.edu/entries/game-theory/>

Fudenberg, Drew & Tirole, Jean (1991), Game theory, MIT Press, ISBN 978-0-262-06141-4 , Chapters 1,3,6,8

Erstatter:

IMT4771

Supplerende opplysninger:

There is room for 50 students for the course.

Klar for publisering:

Ja

IMT4881 Fordypningsemne - 2011-2012

Emnekode:

IMT4881

Emnenavn:

Fordypningsemne

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Vår

Varighet (fritekst):

Can run any time during the full year.

Språk:

Engelsk

Forutsetter bestått:

Must be determined by the supervisor based upon the particular assignment.

Forventet læringsutbytte:

The student will learn how to master a particular topic individually

Emnets temaer:

The student and the supervisor will agree on a topic together. The supervisor is responsible for the fact that the workload for the student should be equivalent to other 5ECTS courses. The student will work as much as possible independently with some supervision by the supervisor.

Pedagogiske metoder:

Annet

Pedagogiske metoder (fritekst):

The teaching methods depend on the particular topic agreed upon by the student and the supervisor

Vurderingsformer:

Vurdering av prosjekt(er)

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Could be both

Utsatt eksamen (tidl. kontinuasjon):

The whole subject must be repeated.

Tillatte hjelpemidler:**Ansvarlig avdeling:**

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Førsteamanuensis Patrick Bours

Læremidler:

Depending on the particular agreed upon topic

Supplerende opplysninger:

This course is intended for students who want to work independently on a particular topic of his/her interest. The student needs to find a supervisor by him/herself. The supervisor and the student will need to agree on a topic together. Topics can be for example (list is not exclusive):

- * studying a particular topic from literature
- * investigating a particular open research problem
- * performing experiments on a research topic

In general the student will write a report on his studies or findings that can be evaluated either by the supervisor or by an external examiner. Another option for the evaluation could be writing an article for a publication or a presentation at a conference or an oral exam with the supervisor or a third person.

Students are not allowed to take both IMT4881 Specialization course 5 ECTS and IMT4882 Specialization course II 10 ECTS (either IMT4881 or IMT4882).

Klar for publisering:

Ja

IMT4641 Computational Forensics - 2011-2012

Emnekode:

IMT4641

Emnenavn:

Computational Forensics

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Vår

Varighet (fritekst):

Andre halvdel av semesteret

Språk:

Engelsk

Forventet læringsutbytte:

Se engelsk versjon

Emnets temaer:

Se engelsk versjon

Pedagogiske metoder:

Prosjektarbeid

Pedagogiske metoder (fritekst):

Se engelsk versjon

Vurderingsformer:

Vurdering av prosjekt(er)

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Se engelsk versjon

Utsatt eksamen (tidl. kontinuasjon):

Se engelsk versjon

Tillatte hjelpemidler:**Obligatoriske arbeidskrav:**

None.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Katrin Franke

Læremidler:

Se engelsk versjon

Supplerende opplysninger:

Se engelsk versjon

Klar for publisering:

Ja

IMT4612 Machine Learning and Pattern Recognition I - 2011-2012

Emnekode:

IMT4612

Emnenavn:

Machine Learning and Pattern Recognition I

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Vår

Språk:

Engelsk

Anbefalt forkunnskap:

Expected prior-knowledge: Understanding of basic statistics like probability density function, variance, etc. Basic analysis and matrix algebra. Digital image Processing with Matlab (a student should be able to do some basic manipulations of images)

Forventet læringsutbytte:

This course develops understanding of use of statistical analysis for multidimensional data. It also give fundamentals to understand data analysis from raw measurement values to higher level decision making in color and image context. The course develops basic understanding for difference between analysis with or without a priori data as well as ways to evaluate results. The methods will be learned in practical sessions, where they will be programmed and tested with real data. The course is practice oriented, where students learn basics of data analysis useful in color, color image and spectral image analysis and processing. In lectures basics of methods are lectures and in practical session, their usage is practices. The aim is not to get deep theoretical understanding and derivation of methods.

On completion of this course the students will be able to:

- Understand principles how multidimensional statistical methods differ from one dimensional methods.
- Program some basic clustering and classification methods and test their validity.
- Program some basic Neural networks methods and test their validity.
- Extract features from raw, measured values of data to be analysed.
- Understand the distribution of information in statistical analysis and meaning in data representation.
- To apply basic statistical and data analysis methods to color and image data.

Emnets temaer:

Basics of multidimensional statistical analysis.

- Principal component analysis.
- Data classification: Bayesian classifier, k-NN classifier, basics of neural networks.
- Data clustering: k-means clustering, Self-Organizing map.
- Classification and clustering validity testing: leave-one-out, ground truth.

Practical Laboratory Sessions:

- Write spectral color and image data reading and writing routines by Matlab
- Produce PCA component images and reconstruct spectral images from PCA eigenimages
- Realize some classification methods by Matlab
- Realize some clustering methods by Matlab
- Make simple tests of spectral image segmentation, spectral image categorization etc. using learned methods

Pedagogiske metoder:

Forelesninger

Lab.øvelser

Nettstøttet læring

Oppgaveløsning

Vurderingsformer:

Skriftlig eksamen, 3 timer

Øvinger

Vurderingsformer:

- Exam (70%)
- Exercises (30%)
- Each part must be individually approved of

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

One internal and one external examiner

Utsatt eksamen (tidl. kontinuasjon):

For the exam: Ordinary re-sit examination.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

None

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Katrin Franke

Læremidler:

Literature and study materials: Handouts of the material covered in the lectures will be distributed.

- R.O.Duda, P.E. Hart, and D.G. Storck: Pattern Classification. 2nd ed., Wiley, 2001.
- Sergios Theodoridis, Konstantinos Koutroumbas. "Pattern Recognition", third edition. Academic Press.

Erstatter:

IMT4611

Supplerende opplysninger:

In case there will be less than 5 students that will apply for the course, it will be at the discretion of Studieprogramansvarlig whether the course will be offered or not and if yes, in which form.

Klar for publisering:

Ja

IMT4621 Biometrics - 2011-2012

Emnekode:

IMT4621

Emnenavn:

Biometrics

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Vår

Varighet (fritekst):

First half of spring semester

Språk:

Engelsk

Anbefalt forkunnskap:

The course content will be complementary to the course IMT4721 "Authentication".

Forventet læringsutbytte:**Knowledge:**

The candidate possesses advanced knowledge in Biometrics.

The candidate possesses thorough knowledge about theory and scientific methods relevant for design, development and operation of biometric access control systems.

The candidate is capable of applying his/her knowledge in new fields of IT-security systems.

Skills

The candidate is capable of analyzing existing theories, methods and interpretations in the field of biometrics and working independently on solving theoretical and practical problems.

The candidate can use relevant scientific methods in independent research and development in biometrics.

The candidate is capable of performing critical analysis of various literature sources and applying them in structuring and formulating scientific reasoning in biometrics.

The candidate is capable of carrying out an independent limited research or development project in biometrics under supervision, following the applicable ethical rules.

General competence

The candidate is capable of analyzing relevant professional and research ethical problems in biometrics.

The candidate is capable of applying his/her biometric knowledge and skills in new fields, in order to accomplish advanced tasks and projects.

The candidate can work independently and is familiar with biometric terminology.

The candidate is capable of discussing professional problems, analyses and conclusions in the field of biometrics, both with specialists and with general audience.

The candidate is capable of contributing to innovation and innovation processes.

Objectives:

After the course, the students should have acquired:

1. Knowledge about common statistical tools for biometrics
2. Insight into advantages and disadvantages of biometric characteristics
3. Understanding of multimodal biometrics
4. Knowledge of ethical and privacy issues in biometrics.
5. Understanding of the threats and protection mechanisms for biometric data

Emnets temaer:

- Fingerprint recognition
- Vein recognition
- Face recognition specifically focused on three dimensional data
- Iris recognition
- Multimodal biometrics
- Attack mechanisms
- Privacy Enhancing Technologies

Content

In this course, several key aspects of biometrics are covered. The course begins with an overview of applied statistics and hypothesis tests as well as other common statistical tools for biometrics, and then covers selected biometric concepts, particularly fingerprint recognition, vein recognition, face recognition and iris recognition. To this end, the relevant physiological characteristics, their variability, and potential problems are discussed before analyzing different approaches for each of the attributes to be investigated. In each case, not only benign applications are covered but also potential bottlenecks such as insufficient sample quality along the entire processing chain. The use of multi-biometrics including data fusion is discussed both in the context of robustness against attacks and improving the overall accuracy of the recognition process. The course continues with a discussion of the ethical and privacy-related issues in biometrics, along with possible limitations and technical mitigation mechanisms. Special attention is given to privacy enhancing technologies that provides protection of sensitive biometric data. In this line the course concludes with comparison-on-card approaches and template protection concepts that allow revocation of biometric references.

Pedagogiske metoder:

Annet

Pedagogiske metoder (fritekst):

Tutorial: Afternoon sessions with seminar discussion and practical tasks

Vurderingsformer:

Skriftlig eksamen, 3 timer

Vurderingsformer:

Written examination in English

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by an external examiner.

Utsatt eksamen (tidl. kontinuasjon):

Ordinary re-sit examination.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Dictionaries allowed (no calculator)

Obligatoriske arbeidskrav:

Students can contribute a research report (term paper) on a topic that is chosen by the student in coordination with the lecturer, which will be considered for the assessment

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Christoph Busch

Læremidler:**Recommended literature:**

[1] LI, S. Z., AND JAIN, A. K., Eds. Handbook of Face Recognition. Springer-Verlag,

Heidelberg, Germany, 2005.

[2] MALTONI, D., MAIO, D., JAIN, A. K., AND PRABHAKAR, S. Handbook of Fingerprint Recognition. Springer-Verlag, Heidelberg, Germany, 2005.

[3] WAYMAN, J., JAIN, A., MALTONI, D., AND MAIO, D., Biometric Systems.

Springer-Verlag, Heidelberg, Germany, 2005.

[4] JAIN, L.C., HALICI, U., HAYASHI, I.; LEE, S.B., TSUTSUI, S. Intelligent Biometric Techniques in Fingerprint and Face Recognition. CRC PressVerlag, 1999.

[5] TUYLS, P., SKORIC, B., KEVENAAR, T. Security with Noisy Data. Springer-Verlag, 2007

Supplerende opplysninger:

In case there will be less than 5 students that will apply for the course, it will be at the discretion of Studieprogramansvarlig whether the course will be offered or not and if yes, in which form.

Klar for publisering:

Ja

IMT3511 Discrete Mathematics - 2011-2012

Emnekode:

IMT3511

Emnenavn:

Discrete Mathematics

Faglig nivå:

Bachelor (syklus 1)

Studiepoeng:

10

Varighet:

Vår og høst

Språk:

Engelsk

Forventet læringsutbytte:

Etter fullført emne skal studentene

1. Kunne forstå de grunnleggende elementene av abstrakt algebra
2. Kunne forstå de grunnleggende elementene av kombinatorikk, deriblant grafteori

Emnets temaer:

- Generelle begreper
 - Logikk
 - Bevis
 - Mengder
 - Algoritmer
 - Kombinatorikk
 - Diskret sannsynlighet
- Grafteori
 - Konnektivitet
 - Korteste vei
 - Farging
 - Spennetrær (minimale)
- Tilstandsmaskiner
 - Endelige tilstandsmaskiner
 - Turing maskiner
- Abstrakt algebra
 - Grupper
 - Ringer
 - Kropper
- Kodeteori
 - Hammingavstand
 - Feiloppbyggende koder
 - BCH koder

Pedagogiske metoder:

Forelesninger
Oppgaveløsning
Veiledning

Vurderingsformer:

Muntlig, individuelt

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Intern sensor

Utsatt eksamen (tidl. kontinuasjon):

Ingen kontinuasjon

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Godkjent kalkulator

Obligatoriske arbeidskrav:

Ingen

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Førsteamanuensis Patrick Bours

Læremidler:

- Kenneth H. Rosen: Discrete Mathematics and its Applications, 6th edition, McGraw-Hill International Edition (2007)
- William J. Gilbert and W. Keith Nicholson: Modern Algebra with Applications, 2nd edition, Wiley (2004)

Supplerende opplysninger:

In case there will be less than 5 students that will apply for the course, it will be at the discretion of Studieprogramansvarlig whether the course will be offered or not and if yes, in which form.

Klar for publisering:

Ja

IMT4541 Foundations of Information Security - 2009-2010

Emnekode:

IMT4541

Emnenavn:

Foundations of Information Security

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Første halvdel av semesteret

Språk:

Engelsk

Forventet læringsutbytte:

Having completed the course, the student should have

- understood the key modelling techniques used for secure computer systems and reasoning about them
- good understanding of models and mechanisms for identification and authentication and access control
- obtained a solid understanding of security analysis and developmental assurance techniques and issues

Emnets temaer:

- Identification and authentication mechanisms including biometrics
- Access control models and formalisms
- Decidability results and limitations of access control and security models
- Security models including the Bell-LaPadula, RBAC, and Chinese Wall models
- Information-theoretic models of information flow and covert channels
- Developmental assurance and evaluation criteria

Pedagogiske metoder:

Annet

Pedagogiske metoder (fritekst):

- Lectures
- Term paper

Vurderingsformer:

Annet

Vurderingsformer:

- Written exam (alternatively oral exam): 67%
- Term paper: 33%
- Pass decision is on the cumulative grade.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by external and internal examiner.

Utsatt eksamen (tidl. kontinuasjon):

A new term paper must be provided next autumn. For the exam: Ordinary re-sit examination.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Dictionary, simple calculator

Obligatoriske arbeidskrav:

None

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Stephen Wolthusen

Læremidler:

The following textbooks are the primary references; further recommended reading is provided in the course syllabus.

- M. Bishop: Computer Security: Art and Science. Addison-Wesley, 2003.
- D. Gollmann: Computer Security, 2nd edition Wiley, 2006

Erstatter:

IMT4162 Information Security and Security Architecture

Supplerende opplysninger:

Capacity of the course is limited to 50 students unless explicitly arranged by lecturer.

Klar for publisering:

Ja

IMT4551 Selected Topics in Cryptology - 2009-2010

Emnekode:

IMT4551

Emnenavn:

Selected Topics in Cryptology

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Andre halvdel av semesteret

Språk:

Engelsk

Forutsetter bestått:

IMT4531 Introduction to Cryptology

Forventet læringsutbytte:

After the course the students should acquire:

- Advanced level of understanding of methods of analysis and synthesis of cryptographic systems
- Deep understanding of modern cryptographic theory

Emnets temaer:

1. Stream ciphers
2. Block ciphers
3. Public key ciphers with applications.

Pedagogiske metoder:

Forelesninger
Lab.øvelser
Oppgaveløsning

Vurderingsformer:

Skriftlig eksamen, 3 timer

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by an external examiner

Utsatt eksamen (tidl. kontinuasjon):

Ordinary re-sit examination.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Calculator, dictionary

Obligatoriske arbeidskrav:

None

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Slobodan Petrovic

Læremidler:

Books:

1. Introduction to Cryptography and Coding Theory, 2. edition, Trappe W., Washington L., Prentice Hall, 2006, ISBN: 0131981994.

2. Handbook of Applied Cryptography, Menezes A., <http://www.cacr.math.uwaterloo.ca/hac>

Erstatter:

IMT 3701 Cryptology

Supplerende opplysninger:

There is room for 50 students for the course.

Klar for publisering:

Ja

Emneside (URL):

<http://www.hig.no/imt/is/courses/imt4551>

IMT4541 Foundations of Information Security - 2010-2011

Emnekode:

IMT4541

Emnenavn:

Foundations of Information Security

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Første halvdel av semesteret

Språk:

Engelsk

Forventet læringsutbytte:

Having completed the course, the student should have

- understood the key modelling techniques used for secure computer systems and reasoning about them
- good understanding of models and mechanisms for identification and authentication and access control
- obtained a solid understanding of security analysis and developmental assurance techniques and issues

Emnets temaer:

- Identification and authentication mechanisms including biometrics
- Access control models and formalisms
- Decidability results and limitations of access control and security models
- Security models including the Bell-LaPadula, RBAC, and Chinese Wall models
- Information-theoretic models of information flow and covert channels
- Developmental assurance and evaluation criteria

Pedagogiske metoder:

Annet

Pedagogiske metoder (fritekst):

- Lectures
- Term paper

Vurderingsformer:

Annet

Vurderingsformer:

- Written exam, 3 hours, (alternatively oral exam): 67%
- Term paper: 33%
- Pass decision is on the cumulative grade.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by external and internal examiners.

Utsatt eksamen (tidl. kontinuasjon):

A new term paper must be provided next autumn. For the exam: Ordinary re-sit examination.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Dictionary, simple calculator

Obligatoriske arbeidskrav:

None

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Stephen Wolthusen

Læremidler:

The following textbooks are the primary references; further recommended reading is provided in the course syllabus.

- M. Bishop: Computer Security: Art and Science. Addison-Wesley, 2003.
- D. Gollmann: Computer Security, 2nd edition Wiley, 2006

Erstatter:

IMT4162 Information Security and Security Architecture

Supplerende opplysninger:

Capacity of the course is limited to 50 students unless explicitly arranged by lecturer.

Klar for publisering:

Ja

IMT4561 Applied Information Security - 2010-2011

Emnekode:

IMT4561

Emnenavn:

Applied Information Security

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Andre halvdel av semesteret

Språk:

Engelsk

Forventet læringsutbytte:

Students who have passed this course should:

- have acquired good knowledge of the common terminology in information security
- have working knowledge of security analysis methods
- have a good understanding of selected attack mechanisms and techniques and their employment by malicious software
- have working knowledge of database security
- have good understanding of design principles for secure information systems

Emnets temaer:

- Core terminology for information security
- Authentication and authentication techniques
- Security analysis methods
- Design principles for secure information systems
- Case studies of secure system design
- Database security
- Attack mechanisms and techniques
- Malicious software

Pedagogiske metoder:

Forelesninger
Oppgaveløsning
Prosjektarbeid
Annet

Pedagogiske metoder (fritekst):

Annet - Tutorials

Vurderingsformer:

Annet

Vurderingsformer:

Written examination, 3 hours, (2/3) in conjunction with term paper (1/3). Pass decision is on the cumulative grade.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Evaluated by the lecturer.

Utsatt eksamen (tidl. kontinuasjon):

A new term paper must be provided next autumn. For the exam: Ordinary re-sit examination.

Tillatte hjelpemidler:**Tillatte hjelpemidler (gjelder kun skriftlig eksamen):**

Simple calculator

Obligatoriske arbeidskrav:

None.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Stephen Wolthusen

Læremidler:

Books:

- M. Bishop: Computer Security: Art and Science. Addison-Wesley, Reading, MA, USA (2002)
- D. Gollmann: Computer Security, 2nd ed. John Wiley & Sons, New York, NY, USA (2006)
- M. Gasser: Building a Secure Computer System. Van Nostrand Reinhold, New York, NY, USA (1988)
- R. Anderson: Security Engineering: A Guide to Building Dependable Distributed Systems. John Wiley & Sons, Chichester, UK (2001)
- A. K. Jain, P. J. Flynn, and A. A. Ross: Handbook of Biometrics. Springer-Verlag, Berlin, Germany (2007).

Erstatter:

IMT4162 Information Security and Security Architecture

Klar for publisering:

Ja

IMT4901 Masteroppgave - 2011-2012

Emnekode:

IMT4901

Emnenavn:

Masteroppgave

Faglig nivå:

Master (syklus 2)

Studiepoeng:

30

Varighet:

Høst

Vår

Varighet (fritekst):

Se engelsk beskrivelse.

Språk:

Norsk, alternativt engelsk

Forutsetter bestått:

Se engelsk beskrivelse.

Forventet læringsutbytte:

Se engelsk beskrivelse.

Emnets temaer:

Se engelsk beskrivelse.

Pedagogiske metoder:

Prosjektarbeid

Samling(er)/seminar(er)

Veiledning

Vurderingsformer:

Vurdering av prosjekt(er)

Vurderingsformer:

Se engelsk beskrivelse.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Se engelsk beskrivelse.

Utsatt eksamen (tidl. kontinuasjon):

Se engelsk beskrivelse.

Tillatte hjelpemidler:**Obligatoriske arbeidskrav:**

Se engelsk beskrivelse.

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Prodekan/Vicedean Rune Hjelsvold

Klar for publisering:

Ja

Emneside (URL):

<http://www.hig.no/imt/emnesider/imt4901>

IMT4601 Research Project Planning - 2009-2010

Emnekode:

IMT4601

Emnenavn:

Research Project Planning

Faglig nivå:

Master (syklus 2)

Studiepoeng:

5

Varighet:

Høst

Varighet (fritekst):

Andre halvdel av semesteret

Språk:

Engelsk

Forutsetter bestått:

IMT 4421 Scientific methodology

Forventet læringsutbytte:

The Pre-project shall prepare the students to perform their master thesis on time, and with the expected quality.

Having completed the course, the students should have required:

- An understanding of academic writing style and documentation structure.
- The ability to formulate a research problem and research questions.
- An understanding of ethical issues in research.

Emnets temaer:

1. Problem description and choice of methods
2. Use of library resources
3. Project planning

Pedagogiske metoder:

Forelesninger
Nettstøttet læring
Obligatoriske oppgaver
Prosjektarbeid
Samling(er)/seminar(er)
Veiledning

Vurderingsformer:

Vurdering av prosjekt(er)

Vurderingsformer:

Final report counts 100%.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

External and internal examiners on the final report.

Utsatt eksamen (tidl. kontinuasjon):

The whole course must be repeated.

Tillatte hjelpemidler:**Obligatoriske arbeidskrav:**

None

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor Einar Snekkenes

Erstatter:

IMT4441 Forskningsprosjektplanlegging

Klar for publisering:

Ja

Emneside (URL):

<http://www.hig.no/imt/is/courses/imt4601>

IMT4581 Nettverkssikkerhet - 2010-2011

Emnekode:

IMT4581

Emnenavn:

Nettverkssikkerhet

Faglig nivå:

Master (syklus 2)

Studiepoeng:

10

Varighet:

Vår

Språk:

Engelsk

Anbefalt forkunnskap:

Noe kjennskap til kryptologi

Forventet læringsutbytte:

Se engelsk versjon

Emnets temaer:

Se engelsk versjon

Pedagogiske metoder:

Essay

Forelesninger

Vurderingsformer:

Annet

Vurderingsformer:

Totalvurdering bestående av 100 poeng hvorav 50 poeng kan oppnåes på essay og 50 poeng på 3-timers skriftlig eksamen. Omregning fra 100-poengskala til A-F-skala skjer i henhold til anbefalt omregningstabell, men emneansvarlig kan i spesielle tilfeller gjøre små justeringer av grenser for å sikre overenstemmelse med de kvalitative beskrivelsene på A-F-skalaen.

Karakterskala:

Bokstavkarakterer, A (best) - F (ikke bestått)

Sensorordning:

Intern sensor

Utsatt eksamen (tidl. kontinuasjon):

Ordinær kontinuasjon på skriftlig eksamen

Tillatte hjelpemidler:

Tillatte hjelpemidler (gjelder kun skriftlig eksamen):

Ingen

Obligatoriske arbeidskrav:

Ingen

Ansvarlig avdeling:

Avdeling for informatikk og medieteknikk

Emneansvarlig:

Professor II Jan Audestad

Læremidler:

Kompendium forfattet av emneansvarlig, tilgjengelig via Fronter.

Erstatter:

IMT4101 Sikkerhet i distribuerte systemer

Supplerende opplysninger:

Emnet har plass til max. 50 studenter

Klar for publisering:

Ja