Studieplan 2015/2016

One-year study programme in Computer Science

Studyprogramcode
ÅRINF

Short description
A one-year study programme in media and information technology is best suited as an introduction to further studies in media, informatics or computer science, or as a compliment to another education on undergraduate level or higher. Understanding and knowledge in the field of media and IT will give the graduated students advantages in companies that use computers actively and will make computer and media supported work assignments easier and more effective.

Duration
One year, 60 ECTS

Expected learning outcomes

Knowledge:

Students during the academic year have the opportunity to gain a broad understanding of development and maintenance of web solutions, publishing and visual presentation across platforms and technologies, development processes and methods in media and information technology. They should be able to update and further develop the acquired theoretical knowledge and practical skills in this area. The candidate will also have some knowledge of media technology's history, character and place in society.

Skills:

Candidates will through the topics this year be able to apply knowledge about the development of solutions for the web platform and be able to attack the theoretical issues and make informed choices. They should be able to reflect upon their own professional practice and be able to locate, assess and refer to information and technical material and present it so that it highlights a problem. Candidates should also be able to master the most important academic tools, techniques and forms of expression relevant to work in IT-based development projects.

General skills:

After a year of media and IT, the candidate will have a basic understanding of current issues around copyright, authentication, data security and information flow. They should be able to exchange views and experiences with others with a background in media technology, web development and thereby contribute to the development of good practice.

In addition, it will be possible to select an additional 5 credits course in basic mobile systems, which together with the compulsory courses will provide a greater understanding of how to develop systems

adapted to the mobile world.

Target Group
A one-year study programme in media and IT will normally not be sufficient as an education on its own and should therefore be combined with another education. The study programme is suited for people with work experience but lack computer knowledge or as a part of a skills development programme. The study programme can also be the first year of a longer media and IT education.

The study programme is best suited for those who

- are leaving the Upper Secondary School and consider a occupational career within media and IT.
- have a job or an education which expects use of computer tools to perform work assignments.
- need more informatics to be acceptet into a informatics bases master programme, such as Master in Media Technology.

The study programme will together with a bachelor degree in media design, media management, geomatics, electro or similar give the right to apply to the master programme in Media Technology.

Admission Criteria
General matriculation standard with special requirements in Mathematics (R1 or S2).

Course Structure
The course structure of the study programme will give a broad and basic understanding of media, information and communication technology. The teaching method is lecturing in class rooms, auditoriums and laboratory work.

The students will throughout the year of study do individual or group based practical and theoretical assignments.

The study programme courses can principally be divided into two group; media subjects and informatics subjects. The informatics subjects are lectured in the fall semester and are as follows:

- Basic Java programming
- Information and publication technology (media related)
- Information structure and databases

The media subjects are lectured in the spring semester and are as follows:

- Web publishing (informatics related)
- Digital video production

In addition the students can choose an elective course within the media, communication and information technology discipline.

Internationalization
A one-year study programme is not well suited for student exchange, but adjustments can be made if the student contacts the programme coordinator.

Publiser
Yes
Degree
Årsstudium

Courses

Coursecode	Course name	C/E *)	ECTS each. semester	
			S1(A)	S2(S)
IMT1031	**Fundamental Programming**	C	10	
IMT1121	**Introduction to Information Security**	C	10	
REA1101	**Mathematics for computer science**	C	10	
IMT1082	**Object-Oriented Programming**	C		10
IMT2431	**Data Communication and Network Security**	C		10
	Elective course, 10 ECTS	E		10
		Sum:	30	30

*) C - Compulsory course, E - Elective course

Emneoversikt

IMT1031 Fundamental Programming - 2015-2016

Course code:
IMT1031

Course name:
Fundamental Programming

Course level:
Bachelor (syklus 1)

ECTS Credits:
10

Duration:
Autumn

Language of instruction:
Norwegian

Expected learning outcomes:
Knowledge:

- Read and explain fundamental C++ syntax.
- Analyze the problem for simple programming tasks.
- Find and write the program code for solving such a problem.
- Obtain a suitable/appropriate data structures for a computer program, primarily containing arrays/tables.

Skills:

- Using a program develoment tool containing a C++ compiler.
- Understand and use fundamental C++ syntax.
- Writing program code that is implementation/realization of a self-found or already known algorithm.
- Getting to known and change/modify/expand already existing program code.
- Create and manage simple data structures consisting of arrays/tables.

General Competence:

- Work systematically, structured and targeted to solve a (programming) problem.
- Practical own efforts ("hands on ") is the way to new knowledge and skill.

Topic(s):
Construction of programs:
- Step by step
- Algorithms
- Pseudo code
Introduction to language elements as:
- Program structure and expressions
- Types of data, variables, strings and constants
- Operators
- Flow of control (decisions and loops)
- Structures
- Functions and parameters
- Arrays
- Classes and objects
Use of library functions:
- Streams (files and I/O)
- String handling

Teaching Methods:
Lectures
Mandatory assignments
Exercises

Form(s) of Assessment:
Written exam, 4 hours

Grading Scale:
Alphabetical Scale, A(best) – F (fail)

External/internal examiner:
Graded by course instructor and examiner.

Re-sit examination:
Re-sit August 2016

Tillatte hjelpemidler:

Examination support:
All printed matters and hand written notes

Coursework Requirements:
4 of 5 mandatory assignments must be approved by student assistant. No. 1 must be one of them.
Clearly inadequate work, not independently own work or deadline that is not complied is considered as undelivered.

Academic responsibility:
Faculty of Computer Science and Media Technology

Course responsibility:
Høgskolelektor Frode Haug

Teaching Materials:
Lafore, Robert. (2002). Object-Oriented Programming in C++. Indianapolis, IN: SAMS.
Faglærer. Kompendium. Gjøvik: HiG.

Additional information:
The course overlaps entirely with IMT1241 Basic programming in Java

Publish:
Yes

IMT1121 Introduction to Information Security - 2015-2016

Course code:
IMT1121

Course name:
Introduction to Information Security

Course level:
Bachelor (syklus 1)

ECTS Credits:
10

Duration:
Autumn

Duration (additional text):
Fall

Language of instruction:
Norwegian

Expected learning outcomes:
Knowledge

- Define and describe technical, legal and organisational aspects of information security
- Explain the terminology used in information security
- Knows the history, traditions, distinctive characters and societal importance of information systems
- Present the general threat scenario and explain how this is relevant for a given system

Skills

- Apply acquired academic knowledge on practical and theoretical problems and explain his/her choices
- Find, asses and refer to information and scholarly subject matter and present it in a manner that sheds light on the problem
- Masters relevant academic styles in the field of information security

General competence:

- Is aware of relevant academic, legal and professional issues
- Can carry out and document independent work in accordance with good academic practice
- Can communicate academic subject matters, both in writing and orally
- Know basic methods within new thinking and innovation processes

Topic(s):

- Background, motivation and need for information security
- Legal and ethical issues
- Risk management in information security
- Planning for security
- Firewalls and VPN
- Intrusion detection systems
- Authentication
- Cryptography
- Physical security

Teaching Methods:
Lectures
Group works
Mandatory assignments

Form(s) of Assessment:
Portfolio Assessment

Form(s) of Assessment (additional text):
The portfolio consist of 4 assignments, all assignments are evaluated. The assignments are handed in both via Fronter and double-sided paper copies to the exams office.

Grading Scale:
Alphabetical Scale, A(best) – F (fail)

External/internal examiner:
Evaluated by internal and external examiner.

Re-sit examination:
No re-sit examination

Tillatte hjelpemidler:

Coursework Requirements:

- Two portfolio hand-ins during the semester
- Two portfolio oral presentations during the semester
- The student must complete the digital 3IKK course (3 hour creativity course) and the subsequent group work.

Academic responsibility:
Faculty of Computer Science and Media Technology

Emneansvarlig kobling:
Bian Yang

Course responsibility:
Bian Yang

Teaching Materials:
Core reading:

- Michael E. Whitman and Herbert J. Mattord: Principles of Information Security, Thomson Course Technology, 4. ed (2012)
- Gene Kim, Kevin Behr and George Spafford: The Phoenix Project: A Novel About IT, Dev Ops and Helping your Business Win, IT Revolution Press, First edition (2013). Available as e-book on Amazon
- Hand-outs

Additional reading

- Torgeir Daler, Roar Gulbrandsen, Tore Audun Høye og Torbjørn Sjølstad: Håndbok i datasikkerhet - informasjonsteknologi og risikostyring, Tapir Akademisk Forlag, 3. utgave (2010)
- Personopplysningsloven and personopplysningsforskriften (available online: www.lovdata.no)

Publish:
Yes

REA1101 Mathematics for computer science - 2015-2016

Course code:
REA1101

Course name:
Mathematics for computer science

Course level:
Bachelor (syklus 1)

ECTS Credits:
10

Duration:
Autumn

Language of instruction:
Norwegian

Prerequisite(s):
2MX or REA 3022 Matematikk R1 or equivalent course.

Expected learning outcomes:
The students will learn mathematical tools and methods for engineering problem solving, and have a foundation for further study in mathematics and computer science. The course emphasizes applications.

Knowledge

- Understand the relevance of mathematics in engineering problem solving.
- Able to identify applications of mathematics in engineering subjects.
- Know the possibilities and limitations of mathematical software.

The students will have knowledge in the areas of logic and discrete mathematics, with

Skills

- able to understand and use mathematical language.
- able to use mathematical methods and software to solve problems.
- basic mathematical reasoning.

Topic(s):

- Number theory
- Matrices
- Propositional and predicate logic
- Proofs
- Sets, functions and relations
- Enumerative combinatorics
- Graphs and trees
- Automata and languages

Teaching Methods:
Lectures
Mandatory assignments
Exercises

Form(s) of Assessment:
Portfolio Assessment
Written exam, 4 hours

Form(s) of Assessment (additional text):

- Written exam – 4 hours (60%)
- Portfolio (40%)
- The students must pass both the exam and the portfolio.

Grading Scale:
Alphabetical Scale, A(best) – F (fail)

Re-sit examination:
Re-sit August 2016 for the Written examination.

Tillatte hjelpemidler:
D: Ingen trykte eller håndskrevne hjelpemidler tillatt. Bestemt, enkel kalkulator tillatt.

Academic responsibility:
Faculty of Technology, Economy and Management

Course responsibility:
Førsteamanuensis Bernt Tore Jensen

Teaching Materials:
Richard Johnsonbaugh: Discrete Mathematics, 7th ed., Pearson/Prentice Hall

Additional material published on classfronter.

Publish:
Yes

IMT1082 Object-Oriented Programming - 2015-2016

Course code:
IMT1082

Course name:
Object-Oriented Programming

Course level:
Bachelor (syklus 1)

ECTS Credits:
10

Duration:
Vår

Language of instruction:
Norwegian

On the basis of:
IMT1031 - Fundamental Programming

Expected learning outcomes:
Knowledge:

- Read and explain more advanced C++ syntax.
- Explain and use object-oriented approach / thinking.
- Find an suitable/appropriate data structure for moderate big computer program.
- Explain the use of a small programming library (toolbox).
- Develop an application (as project work) consisting of a number of different files.
- Understanding the quality aspects of development and maintenance of software.

Skills:

- Understand and use more advanced C++ syntax.
- Solve programming tasks with object-orientation approach/thinking.
- Using and mastering a programming library.
- Choose, create and manage more sophisticated data structures, primarily consisting of lists and arrays/tables.
- Master tools for version control, code analysis and testing.

General Competence:

- Cooperate with other people in a project.
- Analyze, plan and implement a larger work (project).
- Dealing with and adhere to deadlines.

Topic(s):
Principles for object-orientation
Introduction to language elements as:
- Classes and objects (repetition)
- Overloading
- Inheritance
- Pointers
- Dynamic allocation
- Lists
- Virtual functions and late binding
Bigger programs (application) consisting of multi-files.
Tools for version control, code analysis and testing.

Teaching Methods:
Lectures
Mandatory assignments
Exercises
Project work

Form(s) of Assessment:
Written exam, 4 hours

Grading Scale:
Alphabetical Scale, A(best) – F (fail)

External/internal examiner:
Graded by course instructor and examiner.

Re-sit examination:
Re-sit August 2016

Tillatte hjelpemidler:

Examination support:
All printed and hand-written support material is allowed.

Coursework Requirements:
2 of 3 mandatory assignments and project work must be approved by student assistant. Clearly inadequate work, not independently own work or deadline that is not complied is considered as undelivered.

The mandatory assignments must be submitted before the student can join a group and start the project work. It requires active participation in the project to get it approved. Group participants must sign a paper dealing that all students have been active/participating, and each one can be extracted for an oral exam to get the project approved.

Academic responsibility:
Faculty of Computer Science and Media Technology

Course responsibility:
Høgskolelektor Frode Haug

Teaching Materials:
Lafore, Robert. (2002). Object-Oriented Programming in C++. Indianapolis, IN: SAMS
Faglærer. Kompendium. Gjøvik: HiG

Publish:
Yes

IMT2431 Data Communication and Network Security - 2015-2016

Course code:
IMT2431

Course name:
Data Communication and Network Security

Course level:
Bachelor (syklus 1)

ECTS Credits:
10

Duration:
Vår

Language of instruction:
English

Expected learning outcomes:
Knowledge:

- The candidate possesses thorough knowledge of models and protocols in data communication networks.
- The candidate possesses thorough knowledge in the theory of network security.
- The candidate is capable of applying his/her knowledge in the field of IT-security.
- The candidate is capable of updating his/her own knowledge in data communication networks.

Skills:

- The candidate is capable of performing basic network administration tasks.
- The candidate is capable of performing error tracking and solving in basic networks.
- The candidate knows relevant methods and terminology in the area of data communications.

General competence:

- The candidate is capable of working independently and in groups in the field of data communication.
- The candidate is capable of designing, analyzing, and performing maintenance on basic networks.

Objectives:
After completion of the course, the students:

- Will have knowledge of the most used standards and protocols for data communication.
- Will understand the principles of network security.

Topic(s):

- Basics of computer networks
- Application layer (HTTP, SMTP, DNS)
- Transport layer (TCP, UDP)
- Network layer (IP, ICMP, routing)
- IPv6 Network addressing
- Data link and physical layer (Ethernet, MAC, ARP, witching, VLANs)
- Basics of network security, including applied cryptography
- Authentication in networks (Kerberos)
- Firewalls
- Network Intrusion Detection Systems

Teaching Methods:
Lectures
Laboratory work
Exercises

Form(s) of Assessment:
Other

Form(s) of Assessment (additional text):
The exam consists of three/(four optional) parts. These include the final exam of CCNA R&S Module 1 + 2, a written subnetting exercise, a router configuration part using Packet Tracer simulation software (optional) and a written exam of network security.
Part 1: - Final Exam (50 points) CCNA Module 1, I2N
Part 2: - Final Exam (50 points) CCNA Module 2 R&S
Part 3: - written exam network security (50 points),
       - written exam subnetting (50 points / optional 25 points)
       - optional, skill test Packet Tracer (optional 25 points),
All sub-parts must be passed (>=40%) to pass the course
Conversion from 200 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.

Grading Scale:
Alphabetical Scale, A(best) – F (fail)

External/internal examiner:
Evaluated by internal examiner, external examiner is used periodically (every four years, next time in 2015/2016)

Re-sit examination:
Single Parts of the exam can be re-taken again.

Tillatte hjelpemidler:

Examination support:
None.

Coursework Requirements:
None

Academic responsibility:
Faculty of Computer Science and Media Technology

Emneansvarlig kobling:
Thomas Kemmerich

Course responsibility:
Førsteamanuensis Thomas Kemmerich

Teaching Materials:
CISCO Netacademy teaching materials.

Handout articles.

Kurose, J. and Ross, K.W. (2008): Computer Networking: A Top-Down Approach, sixth edition. Addison- Wesley (recommended background material).
William Stallings: Cryptography and Network Security: Principles and Practice 6 Ed. (recommended background material).

Replacement course for:
IMT3371

Publish:
Yes

Elective course, 10 ECTS - 2015-2016

Course name:
Elective course, 10 ECTS

Course level:
Bachelor (syklus 1)

ECTS Credits:
10

Duration:
Autumn and spring

Language of instruction:
Norwegian

Expected learning outcomes:
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Topic(s):
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Teaching Methods:
Group works

Form(s) of Assessment:
Exercises

Grading Scale:
Pass/Failure

Tillatte hjelpemidler:

Academic responsibility:
Faculty of Technology, Economy and Management

Course responsibility:
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Publish:
Yes