Module Description Booklet

Bachelor Program's Information & Communication Technology

ICT & Software
ICT & Business
ICT & Technology

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Introduction

In this booklet you will find a description for (almost) all modules that form part of the Bachelor Degree Program: Information & Communication Technology. In the curriculum you can find which module is part of your program. If you started in Februari 2016, the curriculum of Feb2016 is your study program. If you have questions about your program, consult your mentor.

Every module description starts with a module code. In the first line you will find the study load in EC's, which is an indication of how much time the 'average' student will need to complete the module (1 EC is 28 hours).

The Entry requirement tells you how the course builds on a previous course. Some modules have entry requirements that will be checked during the course. If you do not meet the entry requirements, you will be excluded from the course.

You will further be able to see what the subjects are, the materials that will be used and what type of assessment is used.

Every module is examined twice a year. The modules are given in alphabetical order.

Table of Contents

ANDR1, Android 1

Study Load: 3 EC
Entry requirement: JAVA language introduction (given in OS1 in week 1)
Subjects:

- (Introduction Java)
- Designing for mobile applications
- Interaction design
- Foundation for building Android applications

Course Material:

- t.b.d.

Examination:

- t.b.d.

Course is developed from apr16-aug16.

ANDR2, Android 2

Study Load: 3 EC
Entry requirement: Followed ANDR1
Subjects:

- Designing mobile applications
- Building Android applications

Course Material:

- t.b.d.

Examination:

- t.b.d.

Course is developed from apr16-oct16.

B-Dutch, Business program from the Dutch ICT department

Study Load: 18 EC
Entry requirement: Followed EXC, STAT, PRIN
Subjects:

- Financing and investment analysis
- Project planning with PERT & CPM
- SAP Business
- Supply Chain Management
- Administrative organization
- Planning and executing projects

Course Material:

-

Examination:

- written exams
- group assignments which have been assessed by individual contribution and individual portfolios.
- real live performances

BEC1, Business Economics 1

Study load: 3 EC
Entry requirement: none
Subjects:

- Introduction to managerial accounting
- Cost volume analysis
- Break even analysis
- Cost categories: Labor, depreciation methods, taxes (VAT, BTW, I Tax, C Tax)
- Absorbtion versus direct costing
- Full costing: mark-up methods and time pricing
- Budgeting

Course material:

- Capita Selecta from free E-books on the intranet
- Assignments provided by lecturer on Sharepoint and internet resources

Examination:

- Group assignments which have been assessed by individual contribution and individual portfolios.
- Written exam

BEC2, Business Economics 2

Study load: 3 EC
Entry requirement: Followed BEC1
Subjects:

- Introduction to financial reports
- Introduction to financial ratios
- Financial accounting scenario: Ledger, Journal, Daybooks, Subsidiaries, Computerized
- Special entries: Accrual <> cash system, error bookings, interest bookings, private accounts and funds transfer

Course material:

- Capita Selecta from free E-books on the intranet
- Assignments provided by lecturer on Sharepoint and internet resources

Examination:

- Group assignments which have been assessed by individual contribution and individual portfolios.
- Written exam

DUTCH, introduction Dutch culture and language

Study load: 2 EC
Entry requirement: none
Subjects:

- Information about the Dutch culture
- Speaking and understanding Dutch
- Information asked for by the students

Course material**:**

- Electronic references

Examination:

- Group assignment
- Compulsory attendance of all classes

CRY, Cryptography

Study load: 3 EC
Entry requirement: Passed PCS1+PCS2+PCS3 or passed P exam
Subjects:

- whole number theory (to really understand RSA)
- symmetric key cryptography (for example DES or AES)
- public key cryptography (for example RSA)

Course material:

- On Sharepoint

Examination:

- Exam + practical

CSA, Client Server Applications

Study load: 3 EC
Entry requirement: none
Subjects:

- Services in the history of programming
- WCF Architecture: Endpoints, Addresses, Bindings and Contracts
- Service Configuration (Programmatic and Administrative)
- Metadata Exchange
- Hosting
- Server Side and Client Side Programming
- Service Contracts and Data Contracts
- Instance Management
- Operation Patterns
- Security

Course material:

- book, student workbook, electronic references

Examination:

- written exam on basic techniques and principles;
- building a number of distributed applications as a skill test

DES, Distributed Embedded Systems

Study Load: 3EC
Entry requirement: Minimal grade 5 for ES1 and minimal grade 5 for NETWT
Subjects:

- distributed embedded systems with focus on: client-server architecture, addressing, binding, contracting, hosting, session management, instance management, callbacks, events
- network technology: IPv6 and security
- application development with Arduino's and a CAN-bus

Course Material:

- student workbook
- online tutorials

Examination:

- exam + practical

DPR, Design patterns

Study Load: 3EC
Entry requirement: (Passed P exam or PCS1+PCS2+PCS3 passed) and minimal grade 5 for the course OOD1
Subjects:

- Understanding of the usefulness of Design Patterns
- Evaluation of each pattern in terms of reusability, maintainability, extensibility
- Implementation (C# or Java) and Design (UML) of several Design Patterns

Course Material:

- Lecture notes and ppt's
- Book : **Heads first Design Patterns** , 1st Edition, Erik Freeman, Kathy Sierra and Bert Bates, O'Reily, ISBN-13: 978-0-596-00712-6, ISBN-10: 0-596-00712-4

Examination:

- Practical's
- Oral exam

DWH, Data warehousing

Study load: 3EC
Entry requirement: Followed EDB1, EDB2
Subjects

- Understanding Data Warehousing: the new paradigm specifically intended to provide vital strategic information for the business managers and analysts.
- Understanding/investigating the radical changes for the information technology departments.
- Understanding impact of data warehousing on IT professionals and business users.
- Study topics: planning, requirements, architecture, infrastructure, design, data preparation, information delivery, deployment, and maintenance of a data warehouse.
- Big Data guest lecture

Course material

- Data Warehousing Fundamentals, Paulraj Ponniah, isbn 978-0-470-46207-2

Examination:

- Written exam (60%)
- Presentations and cases (40%)

EBUS, E-Business

Study Load: 3 EC
Entry requirement: Followed WEB1, WEB2
Subjects:

- The economical, organizational and commercial consequences of doing business over the internet (e-commerce)
- Basic knowledge about the most used languages and tools for building a website and a web shop.
- A project in which a web shop is being build.
- Describe how the Internet will help your business to attract customers and encourage growth;
- How to analyze revenue metrics and custom reporting;
- Describe key digital measurement concepts, terminology and analysis techniques; - Navigate Google Analytics reports with specific examples for evaluating your digital marketing performance.

Course Material:

- Lecture notes and ppt's,

Examination:

- Exam
- A ready-made and functional web shop.
- E-Business plan and presentation

EDB1, Databases 1

Study load: 3 EC
Entry requirement: none
Subjects:

- Introduction to database management systems; Relational database model concepts;
- Design and verification of a relational model (defining constraints and normalization);
- Implementation of a relational model (with SQL);
- Introduction to MS Access; Implementation of a relational model in MS Access;
- Implementation of simple queries (using SQL and QBE) in MS Access

Course materials:

- Database Processing, David Kroenke & David Auer, 12th edition

Examination:

- Written exam

EDB2, Databases 2

Study load: 3 EC
Entry requirement: Followed EDB1
Subjects:

- Fact-finding techniques
- Entity-relationship modelling
- Enhanced entity-relationship modelling
- Conceptual database design methodology

- Logical database design methodology
- Physical database design methodology
- Create and drop tables, indexes, permissions and constraints in an Oracle database

Course materials:

- Database Processing, David Kroenke & David Auer, 12th edition

Examination:

- Written exam

EDB3, Databases 3

Study load: 3 EC
Entry requirement: Followed EDB2
Subjects:

- Principles of relational databases
- Design and implementation of complex queries in SQL
- Data manipulation.
- ACID
- Concurrency control
- Oracle SQL practical

Course materials:

- Database Processing, David Kroenke & David Auer, 12th edition

Examination:

- Written exam + practical

EDB4, Databases 4

Study load: 3 EC
Entry requirement: Followed EDB3
Subjects:

- Design and implementation of (stored) procedures and cursors with PL/SQL;
- Implementation of assertions and triggers for the preservation of constraints;

Course materials:

- On Sharepoint

Examination:

- Written exam + practical

EL, Embedded Linux

Study load: 3 EC
Entry requirement: (Passed P exam or passed ES1+ES2) and minimal grade 5 for course ES3 and minimal grade 5 for course PRC1
Subjects:

- Embedded Linux: characteristics and differences with the normal Linux distributions
- application development for Embedded Linux: cross compilation and execution
- setup a network between host and target, including a webserver
- organization of the root file system

- using USB, e.g. to control a Xbox game controller via libUSB
- busybox: functionality and configuration

Course material:

- Book: Embedded Linux Primer, Christopher Hallinan, Prentice Hall, 978-0131679849
- Student workbook
- on line tutorials

Examination:

- practical
- written exam

ES1, Embedded systems 1

Study load: 3 EC
Entry requirement: none
Subjects:

- Programming the Arduino in C/C++
- Applying the Arduino library
- Connecting hardware to the Arduino, like: led, button, servo motor, temperature sensor and distance sensor

Course materials:

- Slides and online tutorials

Examination:

- Written exam + practical

ES2, Embedded systems 2

Study load: 3 EC
Entry requirement: Followed ES1
Subjects:

- basics of electronics (Ohm's law) in particular for resistors and diodes (leds)
- calculations of voltage sharing, current sharing
- set up protocols between systems (state machines, non-blocking, extendible, acknowledgements)
- applying analog sensors (for example LDR, NTC)

Course materials:

- Slides and online tutorials

Examination:

- Written exam + practical

ES3, Embedded systems 3

Study load: 3 EC
Entry requirement: Passed P exam or passed ES1+ES2
Subjects:

- basics of servo motors
- applying two-wire interface (for example I2C and SPI) to control devices

- applying algorithms for interpolation, integrator, moving average
- embedded unit testing

Course materials:

- Slides and online tutorials

Examination:

- Written exam + practical

ES4, Embedded systems 4

Study load: 3 EC
Entry requirement: (Passed P exam or passed ES1+ES2) and followed PRC1 and followed ES3
Subjects:

- understanding the microprocessor architecture, taking an Arduino as an example
- reading a data sheet
- controlling GPIO, interrupts, timers, watchdog via the register map
- realize a hardware Digital Analog Converter
- investigate and optimize the power consumption
- measure with oscilloscope and logic analyzer

Course materials:

- Slides + online tutorials

Examination:

- Written exam + practical

ESP, Embedded Systems Project

Study load: 6 EC
Entry requirement: (Passed P exam or passed ES1) and minimal grade 5 for course PRC1 and followed PRC2
Subjects:

- Based on user requirements, set up an embedded system including functional requirements, design and test plan
- UML: class diagram, state transition diagram, message sequence charts
- in C++, develop software for an Arduino coupled with a Centipede device and a Laundry Machine simulator
- set up unit tests with mocks and stubs

Course material:

- student workbook

Examination:

- Project results are graded, weighed average is taken

EXC, Excel (was IB3)

Study Load: 3EC
Entry requirement: none
Subjects:

- basic handling of Excel as general business tool
- introduction to Excel as data analysis tool to analyze data (Pivot tables) and to visualize data (charts and conditional formatting)

Course Material:

- book “Slaying Excel Dragons” and accompanying YouTube channel
- Exercises (with solutions) and mockup exams on SharePoint

Examination:

- written exam

FCS, Feedback Control Systems

Study load: 3 EC
Entry requirement: Passed P exam or passed MATH2
Subjects:

- principles of Feedback Control Systems
- open loop vs. closed loop, static vs. dynamic behavior of a system
- transfer function, reduction rules (product, sum, loop redux)
- P, PI, PID controllers for a 1-order process: simulation and analysis

Course materials:

- student workbook
- on line tutorials

Examination:

- written exam and practical

FIS1, Fundamentals for ICT Students 1

Study load: 3 EC
Entry requirement: none
Subjects:

- Basic hardware workings, CPU, GPU, memory & operating system
- Binary, hexadecimal & negative numbers
- Compiling and the programming paradigm
- Presenting and writing a report

Course materials:

- Lecture notes and ppt’s
- Internet

Examination:

- Practical (30% of grade)
- Written exam (70% of grade)

FIS2, Fundamentals for ICT Students 2

Study load: 3 EC
Entry requirement: none
Subjects:

- Introduction to ICT & Business, ICT & Technology and ICT & Software

- Visual studio & DLL's
- Source control
- Testing and debugging

Course materials:

- Lecture notes and ppt's
- Practical readers & tutorials provided on Sharepoint
- Internet
- Lego Mindstorms

Examination:

- Project

IA, Industrial Automation

Study Load: 3EC
Entry requirement: none
Subjects:

- Develop applications for PLC to control actuators and sensors
- Set up a production line
- Understanding of industrial automation by coupling several PLC-controlled modules

Course Material:

- lecture notes and ppt's
- Siemens: Simatic step 7 Manuals

Examination:

- written exam and practical

ICTA, ICT Assessment

Study load: 1 EC
Entry requirement: on invitation only

Course to be developed in September 2016.

IPV, Image Processing Vision

Study Load: 3 EC
Entry requirement: none
Subjects:

- OpenCV (specifically the C# wrapper EMGU)
- Images, pixels, color depth
- Convolution filters (mean, Gaussian, Sobel)
- Image moments
- Canny edge detection
- Hough line/circle detection
- Machine learning (k-nearest)
- Face detection with Haar-cascades

- Capita Selecta (e.g. background subtraction, hand gesture detection, or other)

Course Material:

- Slides, assignments, some background material

Examination:

- Assignments, and optionally a self-defined project that integrates a considerable part of the theory

ITOPS, IT Operations (was ITIL)

Study load: 3 EC
Entry requirement: none
Subjects:

- IT service management processes according to ITIL v3 (grouped into service strategy, service design, service transition, service operation, and continuous improvement)
- Process approach of an organization; 3 layer organization: Strategic, Tactical, Operational
- Quality management; Advising.
- Preparation for the official ITIL v3 Foundation exam

Course materials:

- Foundation of ITIL v3, Jan Van Bon, et al. Van Haren Publishing. ISBN 978 90 8753 057 0
- Sharepoint environment: ITOPS reader, case description, slides

Examination:

- written exam (50%)
- case advisory report and 2 presentations (50%)

MATH1, Mathematics 1

Study load: 3 EC
Entry requirement: none
Subjects:

- sets; algebra of sets
- counting principles; relations; mathematical induction
- logic, propositional calculus, truth tables
- quantifiers: universal, existential, sum, product Course material:

Book:

- Schaum's Outlines Discrete Mathematics, Seymour Lipschuts & Marc Lipson

Examination:

- written exam

MATH2, Mathematics 2

Study load: 3EC
Entry requirement: Followed MATH1
Subjects:

- Linear Algebra: vector form and equation for lines and planes, matrix calculation, normal vector, dot product, cross product

- Automata: alphabet, words, languages, regular expressions, state diagram; finite state machines, powerset construction

Course material:

- Book: Schaum's Outlines Discrete Mathematics, Seymour Lipschuts & Marc Lipson
- Reader: on Sharepoint

Examination:

- written exam

MATH3, Mathematics 3

Study load: 3EC
Entry requirement: Followed MATH1 and followed MATH2
Subjects:

- (Isomorphic) graphs; Adjacency matrix; Eulerian trail, Fleury's algorithm
- rooted trees, centroid, center; Search methods (DFS, BFS); (Minimum) spanning trees
- Shortest path algorithms; (Binary) trees; Prefix code
- Huffmans algorithm; Networks (capacity, flow)

Course material:

- Book: Schaum's Outlines Discrete Mathematics, Seymour Lipschuts & Marc Lipson
- Reader: on Sharepoint

Examination:

- written exam

MDD, Model Driven Design

Study Load: 6EC
Entry requirement: Minimal grade 5 for course OOD1
Subjects:

- Design system with SysUML
- Develop software using UML Programming

Course Material:

- lecture notes and ppt's
- IBM Rational Rhapsody software Manuals

Examination:

- Assignments

MDW, Middleware

Study load: 3 EC
Entry requirement: Minimal grade 5 for course CSA
Subjects:

- Services in the history of programming
- WCF Architecture: Endpoints, Addresses, Bindings and Contracts
- Service Configuration (Programmatic and Administrative)
- Metadata Exchange; Hosting; Server Side and Client Side Programming
- Service Contracts and Data Contracts

- Instance Management; Operation Patterns; Security

Course material:

- student workbook, electronic references

Examination:

- Designing and building an distributed application as a skill test

NETWB, Networks for B

Study load: 3 EC
Entry requirement: none
Subjects:

- Server, client, TCP/IP, network, switch, router, segment, Directory Services, Active Directory, DNS, DFS en DHCP.
- IP4 and IPv6-concepts
- Calculating subnets using TCP/IPv4
- Internet topology; The Cloud
- Installing Windows 7 of 8, Windows Server (20XX) en Linux in VM-ware
- Implement Active Directory
- Configure a fileserver (Windows and Linux)
- Using the AGDLP-strategy from Microsoft to assign permissions to users.

Course material:

- electronic material
- VMWare

Examination:

- Student must be able to design, configure and implement a network (LAN) for a company.

NETWS, Networks for S

- see NETWT

NETWT, Networks for T

Study load: 3 EC
Entry requirement: none
Subjects:

- Network Layered Model, TCP/IP
- IP Protocol, IP Addressing, IP Subnets
- TCP/UDP protocols
- DHCP/NAT protocols
- DNS protocol
- HTTP protocol
- All above mentioned protocols will be practiced in assignments
- Network configuration in Linux environment

Learning Objectives:

- The student can identify different layers of the TCP/IP protocols.
- The student can design network drawing including IP addressing
- The student can use basic Linux networking commands to configure a small IP network
- The student can explain different sort of routes used in static IP routing
- The student can interconnect different nodes of a small network by analyzing and using different types of static routing
- The student can explain difference between static and dynamic IP addressing
- The student can explain the use and the phases of DHCP protocol
- The student can demonstrate the working of DHCP protocol in a networking scenario
- The student can explain the use of NAT protocol
- The student can demonstrate the working of NAT protocol in a networking scenario
- The student can configure basic DNS server in a Linux environment
- The student can name the basic types of DNS records
- The student can explain the basic working of the DNS protocol
- The student can name the basic advantages of the IPv6

Course material:

- Olivier Bonaventure: Computer Networking : Principles, Protocols and Practice
- Netkit Tool, Wireshark, VMWare

Examination:

- all assignments have to be completed
- written exam

OOD1, Object Oriented Development 1

Study Load: 3 EC
Entry requirement: Passed P exam or minimal grade 5 for PCS1 and PCS2. And you followed PCS3 and PCS4.

Subjects:

- UML Use-Cases
- UML Class diagrams
- UML sequence diagram
- Painting in C#
- Unit testing

Course Material:

- lecture notes and ppt's
- Book UML Distilled, A brief guide to the standard Object Modelling Language, Third Edition, Martin Fowler, ISBN13 : 0-321-19368-7 or ISBN10: 978-0-321--19368-1.

Examination:

- written exam + practical

OOD2, Object Oriented Development 2

Study Load: 3 EC
Entry requirements: Passed P exam or PCS1, PCS2, PCS3 and PCS4 are passed with at most one 5. And you followed the course OOD1.

Subjects:

- Develop an application with the help of UML

Course Material:

- Same book as used in the course OOD1

Examination:

- Practical and Presentation

OODB, Object Oriented Development for Business

Study Load: **3**EC
Entry requirement: Passed PCSB
Subjects:

- UML Use-Cases
- UML Class diagrams
- UML sequence diagram
- Using files
- Unit testing
- Develop an application with the help of UML

Course Material:

- Same book as used in the course OOD1 or book used in the SD courses.

Examination:

- Practical and Presentation
- Written exam

OS1, Operating Systems 1

Study load: 3 EC
Entry requirement: none
Subjects:

- JAVA language
- Virtual Machines
- Processes
- Process scheduling
- Multithreading
- Synchronization (critical sections. semaphores)
- Deadlock

Course material:

- Sharepoint

Examination:

- Written exam + Practical

OS2, Operating Systems 2

Study load: 3 EC
Entry requirement: Followed OS1
Subjects:

- Monitors

- Readers/writers
- Banker's algorithm

Course material:

- Sharepoint

Examination:

- Written exam + Practical

PCS1, Programming C# 1

Study Load: 4 EC
Entry requirement: none
Subjects:

- Console applications
- Primitive data types
- Expressions, assignment statement,
- type conversions, operators
- Input/output
- Selection statements (if, switch and conditional operator)
- Loop statements (while and for loops)
- Classes

Course Material:

- Book Visual C# 2012 How to Program, Paul Deitel and Harvey Deitel, Print ISBN10:0-13-337933-7, Web ISBN-10:0-13-338017-3, Book: ISBN 9780273793304

Examination:

- written exam

PCS2, Programming C# 2

Study Load: 4 EC
Entry requirement: Followed PCS1
Subjects:

- Windows applications
- Enumeration
- Overloading
- Arrays
- Collections, lists

Course Material:

- See PCS1

Examination:

- " Live performance" exam

PCS3, Programming C# 3

Study Load: 4 EC
Entry requirement: Followed PCS1 and PCS2
Subjects:

- Inheritance and
- polymorphism

- Interfaces
- Unified Modelling Language (UML) class diagrams
- Exceptions
- Files
- Serialization
- Databases

Course Material:

- see PCS1

Examination:

- " Live performance" exam

PCS4, Programming C# 4

Study Load: 4 EC
Entry requirement: Followed PCS1, PCS2 and PCS3
Subjects:

- Event mechanism
- Delegates
- Searching and sorting
- Linked list, stack and queue

Course Material:

- see PCS1

Examination:

- ' life performance' exam

PCSB, Programming C# for Business

Study Load: 3EC
Entry requirement: Followed PCS1 and PCS2
Subjects:

- How to use a list
- Exception handling
- How to use a RFID-reader in combination with a C#-project
- How to make a connection to a MySql-database, so you can retrieve information from the database and you can change (for instance: insert, update) information in the database
- Inheritance
- Using events

Course Material:

- Electronic references

Examination:

- Assignments

PM, Project Management

Study load: 2 EC
Entry requirement: none
Subjects:

- Introduction to project management

- Writing the Project definition
- Writing the Project phasing
- Working in a group

Course materials:

- Reader: Project Management, an introduction
- Material on Sharepoint

Examination:

- Group assignment
- Compulsory attendance of all classes

POPD1, Professional Orientation and Personal Development 1

Study load: 2 EC
Entry requirements: Students are only allowed to start with the course POPD1 and 2 in the second semester of the first year if they are allowed to enroll in Pro-P.
Subjects:

- DOT Research framework
- Cultural Awareness and communication skills
- Company visits
- Presenting skills

Course materials:

- Sharepoint, CANVAS

Examination:

- Assignments
- Compulsory attendance of all classes

POPD2, Professional Orientation and Personal Development 2

Study load: 1 EC
Entry requirements: Students are only allowed to start with the course POPD1 and 2 in the second semester of the first year if they are allowed to enroll in Pro-P.
Subjects:

- DOT Research framework
- Information gathering skills
- Writing skills

Course materials:

- Sharepoint, CANVAS

Examination:

- Assignments
- Compulsory attendance of all classes

POPD3, Professional Orientation and Personal Development 3

Study load: 2 EC
Entry requirement: none

Course to be developed in September 2016 as preparation for the internship.

PRC1, Programming C (was PCN2)

Study load: 3 EC
Entry requirement: Followed ES1, PCS1, PCS2, PCS3
Subjects:

- The C programming language, with focus on: pointers, arrays, data structures, strings, bit manipulations, file handling
- application development with functional decomposition

Course material:

- student workbook
- on line tutorials

Examination:

- Written exam + Practical

PRC2, Programming C++ (was C++)

Study load: 3 EC
Entry requirement: Followed ES1, PCS1, PCS2, PCS3, PRC1
Subjects:

- The C++ programming language, with focus on: constructors, dynamic memory allocation, inheritance, polymorphism, templates
- application development with analysis of execution timing

Course material:

- Student workbook
- on line tutorials

Examination:

- Written exam + Practical

PRIN, Prince2 introduction

Study Load: 1 EC
Entry requirement: Followed PM
Subjects:

- Prince 2 project management

Course Material:

- Reader
- Sheets
- Video's
- Wal-Mart case

Examination:

- Portfolio (50%) + Written exam (50%), overall score minimal 5,5

ProCp, Project Cphase

Study load: 6 EC
Entry requirement: Followed SD1 and SD2
Subjects:

- Project Plan
- User Requirements with use cases
- Software Specification
- Test plan

Course material:

- Workbook ProC#
- Traffic Control Components (and documentation)

Examination:

- Project results are graded, weighted average is taken

ProEp, Project E-phase

Study load: 7 EC
Entry requirement: Followed CSA
Subjects:

- In this course the skills you have acquired during your study are combined and applied in one big project. A distributed system is designed, built and tested during this project. An investigation towards different middleware techniques (.Net, RMI) is made prior to the design.
- After successful completing this module the student is able to:
- Make a domain analysis of an object-oriented system.
- Add GUI and persistence classes to the domain-model resulting from 1.
- Decide which of the classes will be made remote accessible.
- Decide where functionalities will be implemented.
- Make an implementation in java or C# with use of CORBA, RMI or dotNet.
- Make a comparison between the mentioned types of middleware and justify the type of middleware used for their application.

Examination:

- The individual mark is composed of the assessment of the tutor, the delivered work and the results of a peer assessment

ProP, Project P-phase

Study load: 8 EC
Entry requirements: Students are only allowed to start with the project (ProP) in the second semester of the first year if they have at most one 5 for the modules PCS1, PCS2, EDB1 and EDB2.
Subjects:

- Information analysis;
- Practicing in doing meetings (agenda, minutes), working together;
- Make a (simple) project plan;
- Design a website with html, javascript, php and css;
- Design and implement a database;
- Design and implement some C# programs;

Course materials:
- On Sharepoint

Examination:
- Group assessment

QP, Quality Principles

Study load: 3 EC
Entry requirement: none

Subjects:
- Why quality management? What is Quality management? Methods and systems
- Quality management
- Kaizen and Lean Principles
- Six Sixma
- SOX, SAS-70, Basel II, IFRS
- ISO 9001, ISO 27001
- CMMI, SPI
- IT auditing, Risk Management, controls & dashboards

Course materials:
- On Sharepoint/CANVAS
- Books:
- Assignment information provided by lecturer on Sharepoint and internet resources.

Examination:
- Group assignments which have been assessed by individual contribution and individual portfolios.
- Written exam

SAI, Service Application Integration

Study Load: 3 EC
Entry requirement: none
Subjects:
- In order to execute one business process, users often need to use many different “business” software applications. This is why these “business” applications should be connected with each other through some kind of “middleware” application. The “middleware” integrates all “business” applications by passing data between applications, performing necessary data transformation and routing. In general, “middleware” application can be made by (1) making a custom software application, or (2) using a generic tool like MuleSoft, JBoss, etc.
- In this course you will learn how to use Enterprise Integration Patterns in order to make a custom middleware application which integrates several “business” applications.

Course Material:
- Book: Enterprise Integration Patterns : Designing, Building, and Deploying Messaging Solutions, by Gregor Hohpe, Bobby Woolf, ISBN 0321200683, Addison-Wesley, 2004
- Java EE, Java Messaging Service, JAX-WS, JAX-RS.

Examination:

- Students implement integration of a real-life case example assignment. This assignment is presented to students in week 6. Approximately 5 “business” applications are delivered, and students implement the integration based on a given business case. The final grade is determined based on the following matrix:

	Final SAI grade				
	6	7	8	9	10
The system works correctly with one approval application	x	x	x	x	x
Message Broker	x	x	x	x	x
Correlation Identifier	x	x	x	x	x
Return Address	x	x	x	x	x
Content-Based Router		x	x	x	x
Content Enricher		x	x	x	x
Messaging Gateway			x	x	x
Chained Gateways			x	x	x
The system works correctly with three approval applications				x	x
Recipient List				x	x
Aggregator				x	x
Scatter-Gather				x	x
Flexible evaluation of approval rules (e.g., use of Jeval library).					x

SePr, Secure Programming

Study load: 3 EC
Entry requirement: P certificate Software
Subjects:

- Secure Development Lifecycle, threat analysis, secure programming, secure cryptographic implementations,

Course material:

- Studyguide,
- chapter 1 from book 'Secure Coding, Principles and Practices' ,
- article: 'Threat Modeling', Michael Howard
- article: 'Capturing Security Requirements through Misuse Cases', Guttorm Sindre, Andreas L. Opdahl
- SANS top 25 code errors
- OWASP testing Guide

Examination:

- Assessment (final report, presentation and proof of concept secure system)

STAT, Statistics

Study Load: 3 EC
Entry requirement: none
Subjects:

- Student has basic knowledge of Statistics, know basic terms and knows how to apply them
- Student knows how to interpret, analyze and present data
- Student is able to apply this knowledge using Excel
- Student knows how to set up and execute a basic quantitative research and knows how to process the results of the research with Excel

Course Material:

- Electronic references
- Excel

Examination:

- Written exam (90%)
- Theoretical and practical assignments (10%)

SD1, System Development 1

Study load: 3 EC
Entry requirement: none
Subjects:

- Recall the **basic types of computer-based systems** that a systems analyst needs to address.
- Realize what the many **roles** of the systems analyst are.
- Comprehend the fundamentals of three development methodologies: **SDLC**, the **agile** approach, and **object-oriented** systems analysis and design.
- Depict systems graphically using context-level data flow diagrams, use cases, and use case scenarios.
- Evaluate software by addressing the trade-offs among creating custom software, purchasing COTS software, and outsourcing to an application service provider.
- Recognize the value of interactive methods for information gathering.
- Recognize the value of unobtrusive methods for information gathering.
- Be able to use prototyping for human information requirements gathering.
- Understand agile modelling and the core practices.

Course materials:

- **Book:** Systems Analysis and Design, Kendall and Kendall Ninth edition (global edition) ISBN-13: 9780135094907
- **Book:** Object Oriented Systems Analysis and Design, Ashrafi & Ashrafi 1e 2009 ISBN: 978-1-29203-960-2

Examination:

- Written exam (60%)
- Theoretical and practical assignments and presentations (40%)

SD2, System Development 2

Study load: 3 EC
Entry requirement: Followed SD1
Subjects:

- Comprehend the importance of using logical and physical data flow diagrams (DFDs) to graphically depict movement for humans and systems in an organization.
- Create, use, and explode logical DFDs to capture and analyze the current system through parent and child levels.
- Understand analysts use of data dictionaries for analyzing data-oriented systems.
- Create data dictionary entries for data processes, stores, flows, structures, and logical and physical elements of the systems being studied, based on DFDs.
- Understand the purpose of process specifications.

Course materials:

- **Book:** Object Oriented Systems Analysis and Design, Ashrafi & Ashrafi 1e 2009 ISBN: 978-1-29203-960-2

Examination:

- Written exam (60%)
- Theoretical and practical assignments and presentations (40%)

SD3, System Development 3

Study load: 3 EC
Entry requirement: Followed SD1 and SD2
Subjects:

- Application of SD1, 2 and 3 in a functional design of information systems.

Course materials:

- **Book:** Object Oriented Systems Analysis and Design, Ashrafi & Ashrafi 1e 2009 ISBN: 978-1-29203-960-2

Examination:

- Written exam (60%)
- Theoretical and practical assignments and presentations (40%)

SD4, System Development 4

Study load: 3 EC
Entry requirement: Followed SD1, SD2 and SD3
Subjects:

- The current collection of SOA books and articles is rich on high-level theory but light on practical advice. At the other end of the spectrum are the Web Services books that concentrate on APIs and programming, but gloss over the architecture.
- The Promise of SOA
- SOA — Architecture Fundamentals
- Business Architecture; BPM and SOA
- Service Context and Common Semantics
- Identify and Specify Services
- Design Service Interfaces and Service Implementations

Course materials:

- **Book:** Object Oriented Systems Analysis and Design, Ashrafi & Ashrafi 1e 2009 ISBN: 978-1-29203-960-2

Examination:

- Written exam (60%)
- Theoretical and practical assignments and presentations (40%)

SoT, Service Oriented Techniques

Study Load: 3 EC
Entry requirement: none
Subjects:

- In this course you will learn how to make (web) services and clients. The course covers three techniques in programming language Java: (1) SOAP service applications and SOAP client applications; (2) RESTfull service applications and RESTfull client applications; and (3) Java Messaging Service for asynchronous request-reply communication between two applications.

Course Material:

- Slides and practical assignments on the SharePoint.
- Java EE, Java Messaging Service, JAX-WS, JAX-RS.
- Apache Tomcat, Apache ActiveMQ.

Examination:

- For each of the three assignments (A, B and C) a mark in the range 1 – 10 is given.
- Final mark for SOT is in range 1 – 10 and it is calculated as average mark of assignments A, B and C, under condition that A, B and C are sufficient (all higher than 5 or at most one mark is a 5). If more than one assignment mark is lower than 6, then the end mark is calculated as average, but can be at most 5.

TLA, Applied Linear Algebra

Study load*:* 3 EC
Entry requirement: Followed MATH2
Subjects:

- distances between points, lines and planes
- angles between lines and planes
- left- and right-rotating coordinates systems
- converting a coordinates system
- representing a 3D-world on the screen
- rotations and translations in R3
- matrix calculations
- painter's algorithm
- parallel light and point light

Course material:

- Student Workbook

Examination:

- written exam

T&H, Trends & Hypes

Study load: 2 EC
Entry requirement: Followed POPD module writing skills
Subjects:

- Practice in writing an article about a new trend or hype in ICT. During the graduation all new bachelors will receive a booklet with the articles of all the graduates. So writing a good article is a nice way to present yourself to your classmates of the final year.

Course material

- Student workbook with guidelines for the lay-out of the article

Examination:

- Report

UID, User Interface Design (also called UX)

Study load: 3 EC
Entry requirement: Followed a programming language
Subjects:

- Setting up and executing a UI design process with a group.
- Incrementally designing a UI in a group.
- Personal research into techniques needed for UI design.
- Applying techniques during UI design.

Course material:

- Online and other sources you have found yourself during explorations
- Online and other sources provided by teacher
- Students will make an own choice for UI design software to use during this course.
- Optional: 978-1-93435-675-3 " Designed for use" by Lukas Mathis

Examination:

- You will be coached by the teacher during every increment by receiving feedback, which you can use in future increments (feed forward). In the first increment, you only receive feedback and you will not be assessed. The second and third increment will be assessed (by 2 teachers), and the assessment will be based on your group planning of the increment.

WEB1, Web Development 1

Study Load: 3EC
Entry requirement: none
Subjects:

- Understand the main technologies and tools involved in Web development.
- Provide insight in the design and development process of a web application.
- Get to know the following front-end technologies: HTML, CSS and JS.
- Get to know the following back-end technologies: PHP, MySql

Course Material:

- Internet
- Lecture notes and PTT's

Examination:

- Website created during practical

WEB2, Web Development 2

Study Load: 3EC
Entry requirement: Followed WEB1
Subjects:

- Understand the general design pattern MVC (Model, View, Controller).
- Provide insight about the need of a front-end framework in modern web development.
- Understand the main concepts defined in AngularJS framework (Directives, Module, Scope, Model, Expressions, Filter, Views, Controllers, etc.)
- Understand how AngularJS implements the MVC pattern and its variations such us: MVW (Model, View, Whatever)
- Get to know the following front-end tools: Node.js, npm, Bower.
- Apply the knowledge acquired in a practical way by building a fully featured front-end web application.
- Use an API (Application Programming Interface) during implement of the front-end web application.

Course Material:

- Internet
- Lecture notes and PTT's

Examination:

- Web application created during practical

WEB3, Web Development 3

Study Load: 3EC
Entry requirement: Followed WEB1
Subjects:

- t.b.d.
-

Course Material:

- t.b.d.

Examination:

- t.b.d.

Course is developed from apr16-aug16.

----------OLD MODULES----------

CUDA, GPU Programming

Study Load: 84 SLH; 3EC
Entry requirement: C/C++
Subjects:

- Develop applications calculating complex mathematical problems on the CPU using CUDA
- Understand how GPU's are designed and how they are structured.

Course Material:

- lecture notes and ppt's

Examination:

- Practical assignments

EMB2, Embedded Software 2

Study load: 84 SLH, 3 EC
Entry requirement: EMB1

Subjects:

- Use make
- Structure of a Device Driver in Linux
- Create device drivers for several devices in Linux on an embedded system

Course material:

- On Sharepoint

Examination:

- Assignments

ICS, Introduction computer systems

Study load: 84 SLH
Period: Block 1

Entry requirement: none
Subjects:
Binary and hexadecimal numbers
Elementary aspects of computer-hardware and system software like: global computer architecture, global differences between processors, memory, operating systems.
Course material:
On Sharepoint.
Examination:
written exam + practical + project

IDE, Integrated Development Environment

Study load: 84 SLH
Period: block 2

Entry requirement: PCSn1
Subjects:
SVN; IDE; Debugging
C# virtual machine; DLL's; Events

Course material:
On Sharepoint

Examination:
Written exam + practical

ITA1, Internet Applications 1

Study load: 84 SLH, 3 EC
Period: block 3

Entry requirement: none
Subjects:
HTML, CSS and jQuery.
Course material:
Project_ITA1_English
On Sharepoint
Sources on the Internet
Examination:
Assignments + Project

ITA2, Internet Applications 2

Study load: 84 SLH, 3 EC
Period: block 4

Entry requirement: ITA1
Subjects:
PHP/MySQL
Course material:
http://www.php.net/
http://www.mysql.com
Examination:
Individual Theory quizzes
When the average of these quizzes is not >= 4,
No access to the exam in week 9
Exam: week 8 or 9

ITE, Introduction to telematics

Study load: 84 SLH; 3 EC
Period: block 5

Subjects:
Introduction to telematics.
The technological aspects of telematics are discussed, i.e. data communication, computer networks, Internet protocols and standards like DNS and TCP.
OSI reference model.
Attention is also given to telematics applications such as electronic mail, VOIP phone technology, SKYPE multicast conference
Course material:
Data Communications and Networking, 4th edition, Behrouz A. Forouzan, Mc Graw Hill
Sharepoint.
Examination:
Written exam (Multiple choice)
Practical assignments must be sufficient. The loggings are sent by e-mail to the teacher.

NET, Internet and network protocols

Study load: 84 SLH; 3 EC
Period: block 6

Subjects:
IP4 and IPv6-concepts
Internet topology; The Cloud
Quality of Service and Security
Installing Server 2008; XP and Windows 7 in VM-ware
Installing TCP/IP
Connecting networks by DNS systems
ADS: managing a domain infrastructure
Course material:
Data communications and Networking Fourth Edition. Behrouz A. Forouzan
Some readers (a.o. practical assignments) on Sharepoint
Entry requirement: ITE
Examination:
written exam (multiple choice)
finalizing, logging and sending (to the teacher) all practical assignments;

ProB, Project Business

Study Load: 4 EC
Period: block 7 and 8
Entry requirement: none
Subjects:

- In this course the skills you have acquired during your study are combined and applied in one big project
- Project Plan

Course Material:
- Electronic references

Examination:
- Assignments

SCM, Supply Chain Management

Study load: 3 EC
Entry requirement: BEC1 and BEC2
Subjects:
- Processes and control concepts in the field of physical distribution and in the field of material management.
- Stock / inventory control.
- Demand forecasting techniques.
- Ordering systems
- Lean production and JIT principles.
- RCCP, CRP, MRP1 and MRP2 systems.
- Capacity planning.
- Capita Selecta, .

Course material:
- Book "Introduction to Material management" by Arnold Wieland eo
- Assignment information provided by lecturer on Sharepoint and internet resources.

Examination:
- Group assignments which have been assessed by individual contribution and individual portfolio's.

SOA, Service Oriented Architecture

Study load: 3 EC
Entry requirement:
Subjects:
- Web Services Specifications
- Relationship of Web Services and SOA
- Identification and design of services
- Cloud Computing and SOA
- APIs and SOA
- Composing Services
- Using Services to Build Enterprise Solutions
- Case Study — Travel Insurance

Course materials:
- Web Services, Service Oriented Architectures, and Cloud Computing, Douglas K. Barry: Web Services, Service Oriented Architectures, and Cloud Computing
- Service-Oriented Architecture and Design Strategies**,** Mike Rosen, Boris Lublinsky, Kevin T. Smith, Marc J. Balcer

- APIs Strategy Guide, Daniel Jacobson, Greg Brail , Dan Woods

Examination:

- Written exam: multiple choice and case
- Theoretical and practical assignments (Presentations)