# **Course Practical Informatics 1**

Course

Meets requirements of following modules(MID) Course Organization Assessment Course components <u>Lecture/Exercise</u> <u>Lab</u>

Responsible: Prof. Dr. Vogt

## Course

## Meets requirements of following modules(MID)

- in active programs
  - Ba TIN2012 PI1
  - Ba ET2012 PI1
  - Ba TIN2010 PI1
  - Ba ET2010 PI1

## **Course Organization**

Ve	rsion	Course identifiers				
created	2013-07-24	Long name	Practical Informatics 1			
VID	2	CID	F07_PI1			
valid from	WS 2012/13	CEID (exam identifier)				
valid to						

Contact hours per week (SWS)			Total contact hours		Max. capacity	
Lecture	2		Lecture	30	Exercise (unsplit)	
Exercise (unsplit)			Exercise (unsplit)		Exercise (split)	30
Exercise (split)			Exercise (split)	15	Lab	18
Lab	1		Lab	15	Project	
Project			Project		Seminar	
Seminar			Seminar			
Tutorial(voluntary)	1		Tutorial (voluntary)	15		

### Total effort (hours): 150

### Instruction language

• Deutsch

### **Study Level**

• Undergraduate

## Prerequisites

• none

## **Textbooks, Recommended Reading**

• siehe http://www.nt.fh-koeln.de/vogt/dv/dv\_lit.pdf

### Instructors

- Prof.Dr. Vogt
- Prof. Dr. Rosenthal
- Prof. Dr. Büchel

## Supporting Scientific Staff

• Dipl.-Ing. Henk

## **Transcipt Entry**

Practical Informatics 1

## Assessment

Туре							
wE	written exam						

Total effort [hours] wE written exam

Frequency: 2-3/year

## **Course components**

## Lecture/Exercise

## Objectives

## Contents

- algorithms
  - characteristics of algorithms
  - description of algorithms
- digital computers
  - bits/bytes
  - structure of the hard- and software architecture
- basic concepts of programming
  - higher programming languages vs. machine languages
  - compilation vs. interpretation
  - procedural vs. object-oriented languages: C vs. Java
- basic concepts of variables
- scalar data types in Java (and C)
  - numbers
    - value ranges
    - representation of constants
    - operations
  - characters
    - coding standards: ASCII, Unicode
    - operations
  - character strings
  - boolean values
    - representation of constants
    - operations
- control structures in Java (und C)
  - abstract representation
    - Nassi-Shneiderman diagrams
    - flow chart
  - blocks

- branches
  - if
    - if-else
    - switch-case
- loops
  - pre-test loops
    - for
    - while
  - post-test loops: do-while
- static methods in Java
- method definition
  - header with parameters and return type
  - body with return statement
  - method call
    - parameter passing: call by value vs. call by reference
  - overloading
  - storage classes
- arrays in Java
  - storage organisation: references
  - indexing and loops
  - multi-dimensional arrays
- objects and classes in Java
  - object-oriented programming: motivation and fundamental concepts
    - encapsulation
    - objects with members and methods
    - classes
  - constructors
  - access control
  - class members and methods

#### **Acquired Skills**

- writing algorithms to solve given problems
- programming with elementary operations in a higher programming language
- programming with control structures
- programming with methods
- programming with structured data, esp. arrays
- programming with fundemental concepts of object-oriented programming (classes and objects)

## **Additional Component Assessment**

• none

### Lab

## Objectives

### Contents

- programming elementary operations on scalar variables
- programming with control structures (including the design of Nassi-Shneiderman diagrams or flow charts)
- programming with methods
- programming with structured data, esp. arrays

### **Acquired Skills**

- · working with a software development environment
- finding and correcting errors in programs
- designing algorithms and implementing them in a higher language

### **Operational Competences**

• application of the aspects listed above to real-world scenarios in small teams

## **Additional Component Assessment**

• none

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