Systems Analysis and Design
Winter Term 2022-23 – Syllabus (Last Update: 05.10.2022)

Introductory Session

- On the first day of the semester, we will hold an introductory session to explain the course organization and give you an introduction to the course's topics

- We will cover this syllabus as well as the lecture and tutorial for unit 1

- The session will be held on **13 October 2022, 10:00am – 1:30pm**

- Location: Room S11, building 106 (*Seminargebäude*)

Objectives

- By the end of this session, the students…

- … **understand** the **aim and goal** of this **lecture**.
- … are able to **subscribe to the lecture**.
- … **know** the expectations, **course structure and setup**.
- … **know** where to **find further information** about this lecture.

Teaching Team

Lecturer

- **Dr. Karl Werder**
- Email: werder@wiso.uni-koeln.de
- Visiting hours: by appointment via email request

Tutor

- **M.Sc. Christian Hovestadt**
- Email: hovestadt@wiso.uni-koeln.de
- Visiting hours: by appointment via email request

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Dr. Karl Werder: Short Bio

- What happened so far:
    - IT-Specialist, 04-07, FD
    - Buyer 07-11, DA
    - Bachelor, 08-11, DA
    - Master, 11-13, NL
    - Phd, 14-17, MA/KA
    - Pilot Lead/Lecturer, 17-18, E
    - Research Fellow, since 18, K

- Research interests:
    - Software development, Design techniques, Data analytics, Game research

- Teaching:
    - Bachelor:
        - Systems Analysis and Design Seminar
        - Bachelor Seminar
    - Master:
        - Advanced Seminar

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Christian Hovestadt: Short Bio

- Studied and graduated at the University of Cologne
  - M.Sc. Information Systems, University of Cologne (graduated in 2018)
  - Started my PhD studies in 2019 with Prof. Rosenkranz/Prof. Recker
  - Research and teaching assistant at Prof. Schoder's chair from 2014-2018
  - Internships in IT consulting
  - Strong programming background

- My research interests:
  - Artificial Intelligence in Business Processes (Main PhD topic)
    - What happens when autonomous AIs take over process tasks previously carried out by humans?
  - Sharing Economy / Sensing Systems

- What I teach currently:
  - Information Systems Development (BSc, Summer Term)
  - Systems Analysis and Design (BSc, Winter Term)
  - Grundlagen der Wirtschaftsinformatik (BSc BWL, every term)
  - Bachelor/Master Theses

Course Content

- Requirements Analysis and Elicitation

- Systems Modeling

- Unified Modeling Language

- Software Architecture

- Human-Computer Interaction

Course Goals

The students…

- …**understand** the **fundamentals** of Systems Analysis and Design

- … can **determine** systems **requirements**

- … have **basic** skills in different **modelling techniques**

- … can **specify classes and methods**

- … **have** basic **design skills**

Course Context

- Course is part of the Module "Ergänzungsmodul Wirtschaftsinformatik I" [1277BEWIF1] (PO 2015 or PO 2021)

- When completing this course, you will gain 6 ETCS

- Assessment:
    - eExam (90 Minutes)
    - Team Project Report

Recommended Sequence for the Information Systems Bachelor Courses

1st Semester (Winter)	**Information Systems Management** [Basismodul Wirtschaftsinformatik I]	AND	**Database Systems** [Basismodul Wirtschaftsinformatik II]
2nd Semester (Summer)	**Integrated Information Systems** [Aufbaumodul Wirtschaftsinformatik]		
3rd Semester (Winter)	**Systems Analysis & Design** [Ergänzungsmodul Wirtschaftsinformatik I]	OR	**Informationssicherheit & IT-Forensik** [Ergänzungsmodul Wirtschaftsinformatik I]
4th Semester (Summer)	**Information Systems Development** [Ergänzungsmodul Wirtschaftsinformatik II]	OR	**Introduction to Data Science and ML** [Ergänzungsmodul Wirtschaftsinformatik II]
5th Semester (Winter)	**Capstone Project Information Systems** [Schwerpunktmodul Wirtschaftsinformatik]	AND	**Bachelor Seminar**
6th Semester (Summer)	**Bachelor Thesis**		

*We strongly recommend to complete the courses from the 1st-4th semester **before** proceeding with the Capstone Project and the Bachelor Thesis.*

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Our Chair's Teaching Offerings

	Winter Term	Summer Term
PhD		PhD Course (not offered in every year)
Master	Master Thesis (spanning both terms)	
	Systems Engineering for Digital Innovations [Schwerpunktmodul Information Systems IV]	Advanced Seminar IS & Digital Technology [Schwerpunktmodul Seminar Information Systems I/II]
	IS and Environmental Sustainability [Basismodul Information Systems I]	IT Entrepreneurship [Schwerpunktmodul Information Systems ll]
Bachelor	Bachelor Thesis (spanning both terms)	
	Bachelor Seminar Information Systems & Digital Technology (spanning both terms)	
	Systems Analysis and Design [Ergänzungsmodul Wirtschaftsinformatik I]	Information Systems Development [Ergänzungsmodul Wirtschaftsinformatik ll]

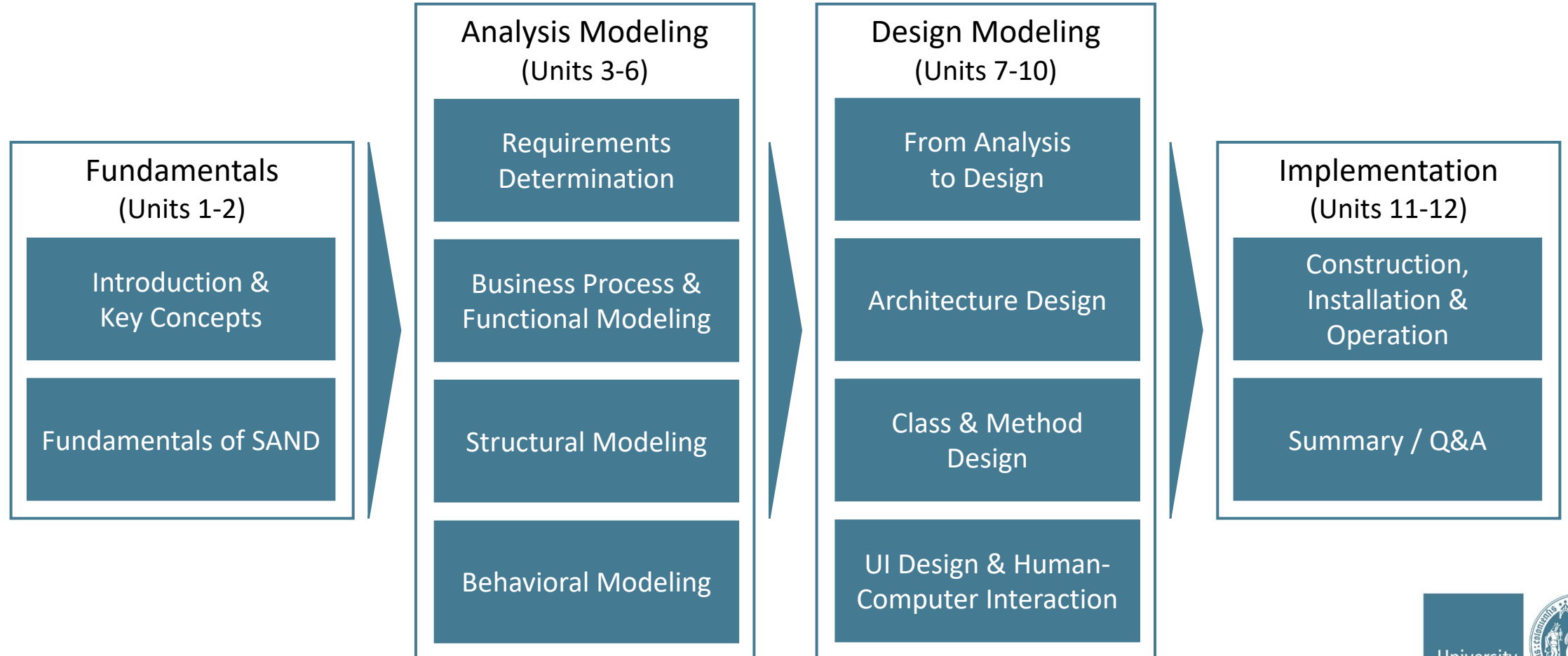# Course Changes & Improvements

- Course Changes:
    - Switching back to attendance-based teaching
    - Digital exercises remain available
    - Split lecture and course slots to two different days

- Examination Improvement:
    - E-exam now in the PC pool

Course Structure

- The course is structured into **four content blocks**:
  - Fundamentals
  - Analysis Modeling
  - Design Modeling
  - Implementation

- Each content block contains **multiple units**,
  - One unit represents roughly one lecture in terms of volume. They are numbered from 1 to 12.

- Unit are divided in up to 5 small **sections**.
  - These give each unit more structure.

Overview

Fundamentals
(Units 1-2)

- Introduction & Key Concepts
- Fundamentals of SAND

Analysis Modeling
(Units 3-6)

- Requirements Determination
- Business Process & Functional Modeling
- Structural Modeling
- Behavioral Modeling

Design Modeling
(Units 7-10)

- From Analysis to Design
- Architecture Design
- Class & Method Design
- UI Design & Human-Computer Interaction

Implementation
(Units 11-12)

- Construction, Installation & Operation
- Summary / Q&A

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Lecture Format

Lecture Sessions:

- **First contact** with new content happens here
- We aim to keep lectures **interactive** by involving you in discussions

Guest Lecture Sessions:

- In one or two special lectures, we invite **practitioners as lectures** to give you additional perspectives on the course's topics

Self-study Materials:

- All lecture slides are available in ILIAS
- **Two books** form the basis for the content of the lectures. You can use them to gain additional understanding of the course's topics.

Course Reading

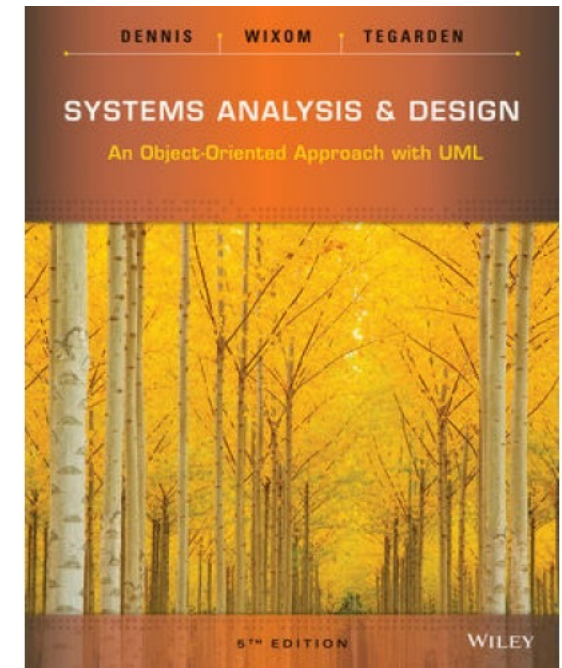Systems Analysis & Design –
An Object-Oriented Approach with UML

> 5th Edition
>
> By Alan Dennis, Barbara Haley Wixom, and David Tegarden
>
> Publisher: Wiley (John Wiley & Sons, Inc.)
>
> ISBN: 978-1-118-80467-4

Available for rental at the university's main library and the institute's library

Session Reading – Software Architecture
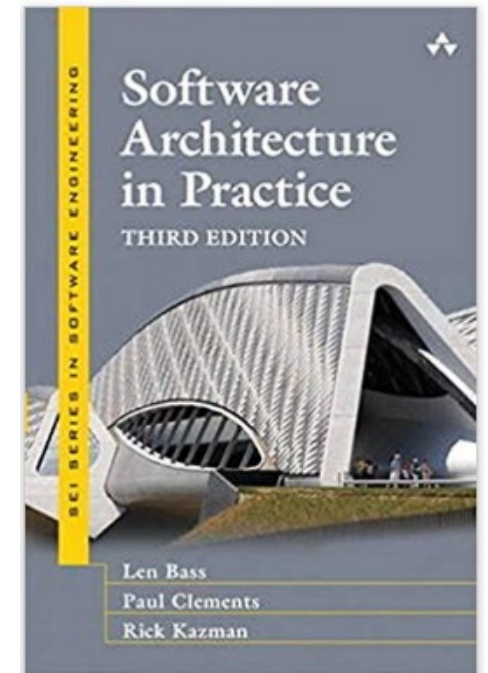
Software Architecture in Practice

 3rd Edition

 By Len Bass, Paul Clements, and Rick Kazman

 Publisher: Addison Wesley

 ISBN: 978-0-321-81573-6

[Available for rental at the university's main library and the institute's library](#)

Guest Lecture – Philipp Bohn

Talk:

Requirements Engineering and Management at msg

Date:

Thursday 17 November 2022 – 14:00

Bio:

- Philipp Bohn is a Lead Project Manager in the area of Travel, Logistics & Network Industries at msg systems ag. Currently, he is working as a Project Manager for msg's customer Toll Collect. In the past, he was responsible for Requirements Engineering and Management in several projects for Toll Collect and he worked as a Test Manager for a well-known German kitchen appliance manufacturer.

Guest Lecture – Pascal Meier

Talk:

Wie bauen Unternehmen Software? – Ein kleiner Einblick in die Entscheidungsfindung bei Softwarearchitekturen

Date:

Monday 19 December 2022 - 10:00

Bio:

Herr Meier ist nach seinem Wirtschaftsinformatikstudium als Host-Programmierer für Warenwirtschaftssysteme gestartet. Danach folgte der Wechsel zu Java als Backend Developer für Buchhaltungssysteme mit einem kurzen Abstecher in die Teamleitung und letztliche der Wechsel in die Beratung. Hier folgte die Weiterentwicklung zum Softwarearchitekten. In diesem Rahmen berät Herr Meier Unternehmen rund um Architekturen auf Basis der Java Virtual Maschine, bei der Integrationsarchitektur zwischen Systemen und unterstützt Entwicklungsteams als Lead Developer.

Tutorial Format

Recap Sessions (for all units, except unit 12)**:**

- We created an **ILIAS exercise set** for each content section
  - No need to prepare them in advance, but feel free to do so
  - We discuss a selection of those exercises in the session, you can use the rest to prepare for the exam
  - You can ask questions about the exercises we did not discuss

- We will do an **interactive Kahoot Quiz** for you to check your learning progress
  - We will also post a link to the Kahoot quizzes in ILIAS after each recap session

Workshop Sessions (for units 4-7)**:**

- There will be **larger-scale exercises** on systems modeling (uploaded to ILIAS)
  - In the workshop sessions, you have time to solve them in groups
  - Afterwards, we discuss your solutions in class

Physical Meetings

Monday Sessions (usually Tutorials)**:**

- 10:00am - 11:30am (every week)
- 12:00pm - 1:30pm (on five days only)
- Room S11, building 106 (*Seminargebäude*)

Thursday Sessions (usually Lectures)**:**

- 2:00pm – 3:30pm (every week)
- Lecture Hall XIa, building 100 (*University Main Building*)

Schedule of Course Sessions (1/3) *

* subject to change

Block	Date	Time	Session Type	Unit	Topic
SAND Fundamentals	10.10.2022	10:00	Introductory Session	1	Introduction & Key Concepts
		12:00			
	13.10.2022	14:00	Lecture	2	Fundamentals of SAND & Planning Phase
	17.10.2022	10:00	Tutorial Recap		
		12:00	-	-	NO CLASS
Analysis Modeling	20.10.2022	14:00	Lecture	3	Requirements Determination
	24.10.2022	10:00	Tutorial Recap		
		12:00	-	-	NO CLASS
	27.10.2022	14:00	Lecture	4	Business Process & Functional Modeling *Use-Case Diagrams, Activity Diagrams*
	31.10.2022	10:00	Tutorial Recap		
		12:00	Tutorial Workshop		
	03.11.2022	14:00	Lecture	5	Structural Modeling *Class Diagrams*
	07.11.2022	10:00	Tutorial Recap		
		12:00	Tutorial Workshop		
	10.11.2022	14:00	Lecture	6	Behavioral Modeling *Sequence Diagrams, Communication Diagrams, State Machine Diagrams*
	14.11.2022	10:00	Tutorial Recap		
		12:00	Tutorial Workshop		
	17.11.2022	14:00	Guest Lecture	3.5	Requirements Engineering and Management at msg
	21.11.2022	10:00	-	-	NO CLASS
		12:00	-	-	NO CLASS

Schedule of Course Sessions (2/3) *

* subject to change

Block	Date	Time	Session Type	Unit	Topic
Design Modeling	24.11.2022	14:00	Lecture	7	From Analysis to Design
	28.11.2022	10:00	Tutorial Recap		
		12:00	Tutorial Workshop		
	01.12.2022	14:00	Lecture	8	Architecture Design
	05.12.2022	10:00	Tutorial Recap		
		12:00	-	-	NO CLASS
	08.12.2022	14:00	Lecture	9	Class & Method Design
	12.12.2022	10:00	Tutorial Recap		
		12:00	-	-	NO CLASS
	15.12.2022	14:00	-	-	NO CLASS
	19.12.2022	10:00	Guest Lecture	8.5	Entscheidungsfindung bei Softwarearchitekturen (viadee)
		12:00	-	-	NO CLASS
	22.12.2022	14:00	-	-	NO CLASS
	26.12.2022	10:00	-	-	NO CLASS (Christmas Holidays)
		12:00	-	-	
	29.12.2022	14:00	-	-	
	02.01.2023	10:00	-	-	
		12:00	-	-	
	05.01.2023	14:00	-	-	

Schedule of Course Sessions (3/3) *

* subject to change

Block	Date	Time	Session Type	Unit	Topic
Design Modeling	09.01.2023	10:00	-	-	NO CLASS
		12:00	-	-	NO CLASS
	12.01.2023	14:00	Lecture	10	UI Design and Human-Computer Interaction
	16.01.2023	10:00	Tutorial Recap		
		12:00	-	-	NO CLASS
Implemen-tation	19.01.2023	14:00	Lecture	11	Construction, Installation & Operation
	23.01.2023	10:00	Tutorial Recap		
		12:00	-	-	NO CLASS
	26.01.2023	14:00	-	-	NO CLASS
	30.01.2023	10:00	-	-	NO CLASS
		12:00	-	-	NO CLASS
	02.02.2023	14:00	Lecture	12	Summary, Q&A for Exams

ILIAS

- All course material are **shared through ILIAS**

- **ILIAS keeps you updated** and informed, e.g.:
  - **News** about the course.
  - **Deadlines** for submissions.
  - **Offers from industry** partners (folder opportunities).
  - ➢ Activate message forwarding to your email inbox

- **If you are not yet a member** of the ILIAS course, …
  - You have to **enroll yourself** to the course via KLIPS2 (you will be automatically added to the ILIAS course on the next day)
  - If you encounter problems, please contact hovestadt@wiso.uni-koeln.de

Assessment

Portfolio exam consisting of…

1) eExam

- Worth 60 points
- Individual
- Date:
    - First option: **10th February 2023**
    - Second option: **17th March 2023**
- 08:30-10:00 (90 minutes)
- Focused on the theoretical knowledge covered in the lecture and the tutorial

2) Team Project

- Worth 30 points
- Team Project (4-5 members)
- One report consisting of 10 tasks
- Submission deadline:
    - **5th February 2023, 11:55pm**
    - Submission via ILIAS
- Focused on executing the analysis and design stages entirely for one practical case

Final Grade

- You will be **assessed against** your **total** achieved **score**:
    - Max. 60 points for the **exam**
    - Max. 30 points for the **team project**

- You **pass** the module when achieving **at least 45 points**

Exam Registration

- Regardless of the day you want to write the eExam, you must register for the **same portfolio exam in KLIPS.** The exam registration in KLIPS is **different from the course registration!** Exam Registration in KLIPS is mandatory to complete the course.
  - ➢ **Deadline:** 31st October 2022 (11:59pm)

- Additionally, you need to fill out two **surveys in ILIAS:**
  - ➢ **Team Registration Survey:** Specify your team name for the team project
    - ○ Try to find a team of motivated students you want to work with
    - ○ Pick a <u>unique</u> team name that you all specify in your individual surveys
    - ○ It is not an issue if you are less than 5 students, we will merge smaller teams after the survey deadline
    - ○ If you do not specify a team name (but register in KLIPS), we assign you to a random team
    - ○ **Deadline:** 31st October 2022 (11:55pm)
  - ➢ **eExam Registration Survey:** Specify the day you want to write the eExam
    - ○ Switching the exam date after the survey deadline is not possible
    - ○ If you register for the first date and get sick on the day of the exam, you may still write the eExam on the second date if you submit an attest from a doctor to us
    - ○ If you don't submit the survey (but register in KLIPS), we assign you to the first exam date
    - ○ **Deadline:** 19th January 2023 (11:55pm)

Group Formation: FAQ

- *"Can we form a group of more than five people?"*
  - ➢ Groups are limited to five students, no exceptions.

- *"We are less than five people in our group. What can we do?"*
  - ➢ Simply register your group in the survey, we will merge smaller groups after the survey deadline. We will make sure that there are no less than four students in any of the final groups.

- *"I cannot find a group."*
  - ➢ Simply fill out the survey without specifying a team name. We will assign you to a random group after the survey deadline.

Volume

- The course is awarded with **six credit points**, equivalent to 180 semester working hours (SWH; 1 SWH = 45 minutes)
    - As a **rule of thumb**, we expect you to invest around 12 SWHs on a weekly basis in total
    - That includes physical attendance in the sessions (4 SWHs), self-study (~5 SWHs), and work on the team project (~3 SWHs)

- Try to optimize your time spent on learning:
    - **Use the books** for reading about topics you find hard to understand
    - **Write your own summaries** early in the semester, you will already remember large parts of them after writing them
    - **Optimize your team project progress** by dividing tasks within the team and establishing your own coordination processes

Q&A for the Exam

In the course session on February 2nd, we will answer any questions you have about the contents of the lectures and the tutorials. Please send in your questions in advance via email (werder@wiso.uni-koeln.de or hovestadt@wiso.uni-koeln.de) no later than February 1st, 10am.

We will also insert the answers to your questions into the lecture slides for unit 12 and upload a new version to ILIAS after the session.

How to Succeed

Please familiarize yourself with, and monitor…

The Unit
- Unit content
- Learning goals
- The syllabus

The Involved People
- Yourself
- Your Project Team
- The Teaching Team

The Course Offerings
- Self-study materials
- Readings
- Take part in lecture & tutorial sessions

The Assessments
- Requirements
- Due dates
- Marking scheme
- Tips in lectures & tutorials

Thanks for your attention!

Please let us know about any questions, comments, or observations

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