

Systems Analysis and Design

Winter Term 2023-24 – Syllabus

(Last Update: 12.10.2023)

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 2023, 10:00am – 1:30pm**
- Location: Room S24, 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

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

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

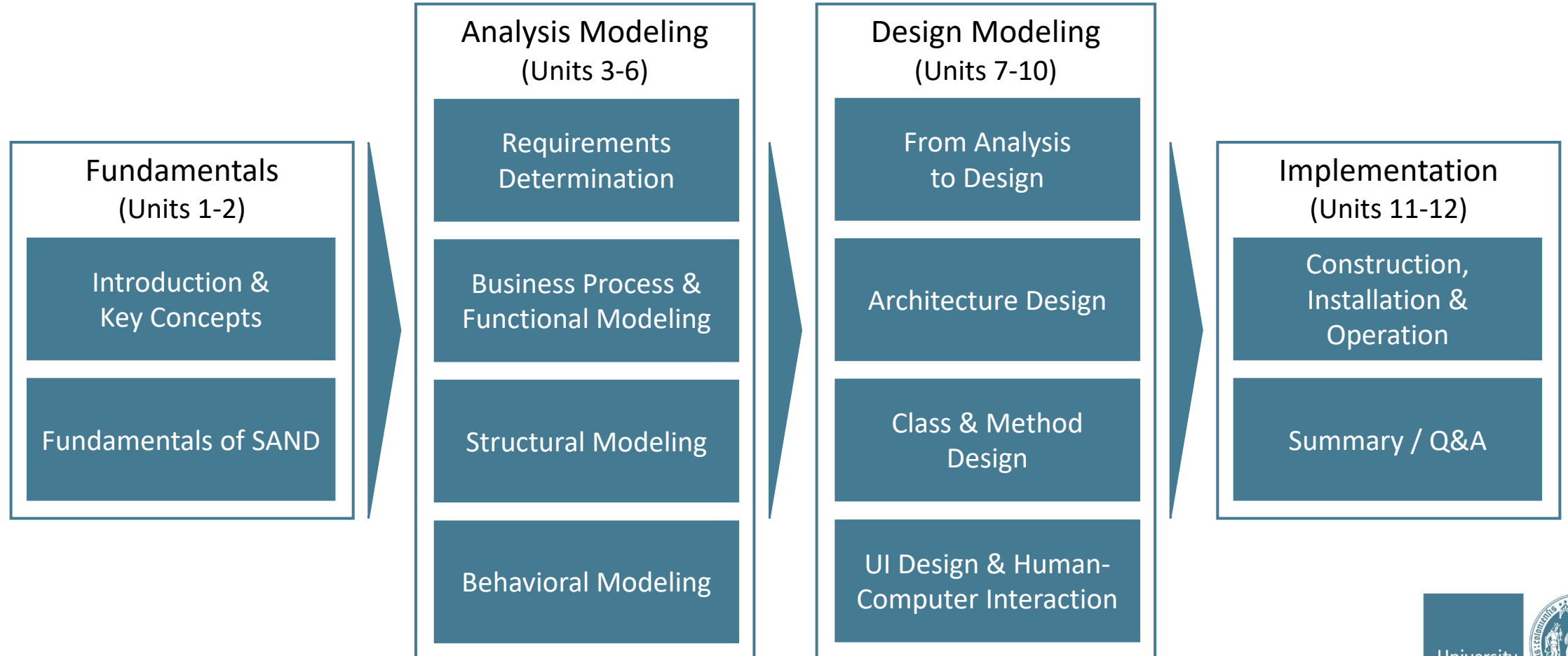
Our Chair's Teaching Offerings

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

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



Lecture Format

Lecture Sessions:

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

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

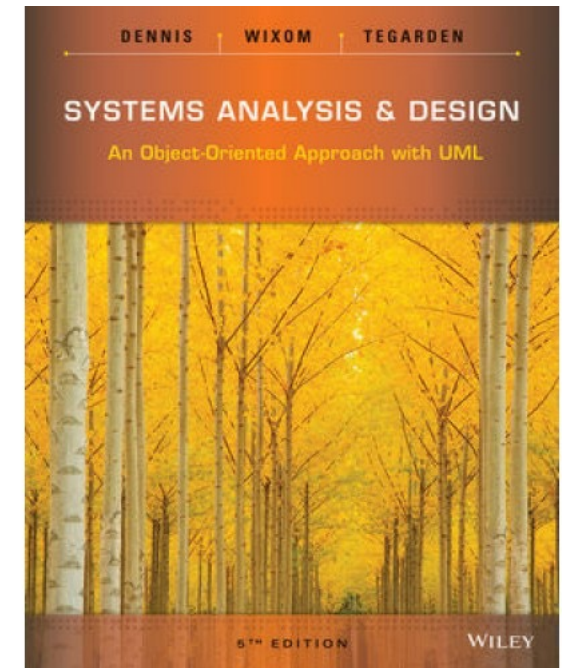
5th Edition

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

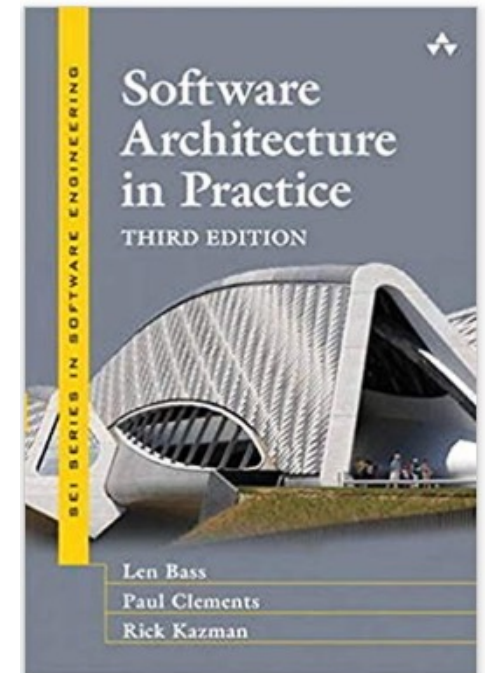
3rd Edition

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](#)



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

Classroom Sessions

Thursday Sessions (usually Lectures):

- 2:00pm – 3:30pm (every week)
- Room S11, building 106 (*Seminargebäude*)

Friday Sessions (usually Tutorials):

- 10:00am - 11:30am (every week)
- 12:00pm - 1:30pm (on five days only)
- Room S24, building 106 (*Seminargebäude*)

Schedule of Course Sessions (1/2) *

* subject to change

Block	Date	Time	Session Type	Unit	Topic
SAND Fundamentals	12.10.2023	14:00	-	-	NO CLASS
	13.10.2023	10:00 12:00	Introductory Session	1	Introduction & Key Concepts
	19.10.2023	14:00	Lecture	2	Fundamentals of SAND & Planning Phase
	20.10.2023	10:00 12:00	Tutorial Recap -		
				-	NO CLASS
Analysis Modeling	26.10.2023	14:00	Lecture	3	Requirements Determination
	27.10.2023	10:00 12:00	Tutorial Recap -		
	02.11.2023	14:00	Lecture	4	Business Process & Functional Modeling <i>Use-Case Diagrams, Activity Diagrams</i>
	03.11.2023	10:00 12:00	Tutorial Recap Tutorial Workshop		
	09.11.2023	14:00	Lecture		
	10.11.2023	10:00 12:00	Tutorial Recap Tutorial Workshop	5	Structural Modeling <i>Class Diagrams</i>
	16.11.2023	14:00	Lecture		
	17.11.2023	10:00 12:00	Tutorial Recap Tutorial Workshop	6	Behavioral Modeling <i>Sequence Diagrams, Communication Diagrams, State Machine Diagrams</i>
Design Modeling	23.11.2023	14:00	Lecture	7	From Analysis to Design
	24.11.2023	10:00	Tutorial Recap		
		12:00	Tutorial Workshop		

Schedule of Course Sessions (2/2) *

* subject to change

Block	Date	Time	Session Type	Unit	Topic
Design Modeling	30.11.2023	14:00	Lecture	8	Architecture Design
	01.12.2023	10:00	Tutorial Recap		
	07.12.2023	14:00	Lecture	9	Class & Method Design
	08.12.2023	10:00	Tutorial Recap		
	14.12.2023	14:00	Lecture	TBA	BUFFER
	15.12.2023	10:00	Tutorial Recap	TBA	BUFFER
	21.12.2023	14:00	-	-	NO CLASS
	22.12.2023	10:00	-	-	NO CLASS
	28.12.2023	14:00	-	-	NO CLASS (Christmas Holidays)
	29.12.2023	10:00	-	-	NO CLASS (Christmas Holidays)
	04.01.2024	14:00	-	-	NO CLASS (Christmas Holidays)
	05.01.2024	10:00	-	-	NO CLASS (Christmas Holidays)
	11.01.2024	14:00	Lecture	10	UI Design and Human-Computer Interaction
	12.01.2024	10:00	Tutorial Recap		
Implementation	18.01.2024	14:00	Lecture	11	Construction, Installation & Operation
	19.01.2024	10:00	Tutorial Recap		
	25.01.2024	14:00	Lecture	12	Summary, Q&A for Exams
	26.01.2024	10:00	-	-	NO CLASS
	01.02.2024	14:00	-	-	NO CLASS
	02.02.2024	10:00	-	-	NO CLASS

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:
7th February 2024 16:00-17:30
 - Second option:
13th March 2024 13:00-14:30
- 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:
 - **29th January 2024, 11:55pm**
 - Submission via ILIAS
- Focused on executing the analysis and design stages entirely for one practical case

Team Project

“Generative AI for Climate Change”

In a group of 4-5 students, your task is to execute the analysis and design phases of a fictional IS development project. This includes determining the requirements, creating analysis- & design-level models, specifying the architecture, and creating UI mockups (but not actually building the system).

We present you a practical problem which your system should address: *The human-made climate crisis requires substantial changes in human behavior and consumption. Develop a digital solution based on the capabilities of generative AI that could help industry/private households to change their carbon footprint and hence fight the climate crisis.*

The assignment will be split into 11 small exercises, which build on units 1-11 of this course. We present one task after the respective tutorial recap session, so that you can directly apply what you learned in that week to your team project. At the end of the semester, you integrate the 11 exercises into one document, forming your final project deliverable.

Further assignment details are available in ILIAS!

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 2023 (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 unique 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 2023 (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:** 21st January 2024 (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 January 25th, 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 (hovestadt@wiso.uni-koeln.de) no later than January 23rd, 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

