Dieses Wahlpflichtmodul ist ein Angebot der:

Fachhochschule Dortmund
University of Applied Sciences and Arts

Master Digital Transformation

Innovation Driven Software Engineering

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Innovation Driven Software Engineering (MOD1-01)

Code Number	Workload	Credits	Semester	Frequency	Duration
48010/11	180 h	6	1	winter semester	1 Semester

1	Course Title		Contact hours	Self-Study	Planned Group Size
	Innovation Driven Software Engineering		4 SWS / 60 h	120 h	25 students

2	Course Description
	Innovation driven software engineering touches every aspect of modern software development. Today's software emphasizes novelty, usability, and joy of use. Modern software is usually created in creative and highly iterative processes. Many steps in these processes involve potential users. This integration of the user can be addressed with the so-called Design Thinking method.
	Refined ideas and prototypes can be the foundation for new startup companies. One way to check the viability is the Business Model Canvas. Agile Software Development puts the focus back on user feedback and iterations. The agile development process is accompanied with an extensive tool chain for designing and creating software solutions. For instance, UML Diagrams, Version control systems, Bug tracker and ticket management systems.

3	Course Structure
	- Design Thinking - Business Model Canvas - Legacy process models - Agile Software Development - Agile Manifesto best practices - UML Modelling - Tooling like git, Bug tracker and ticket management systems, Checkstyle, etc.

4	Application Focus
	- Practical exercises - Realizing a real-world project within a block-week in a team

5	Scientific Focus
	- Written assignment: literature review in the style of a scientific paper up to 10 pages - Performing a survey based on relevant scientific methods

6	Parameters
	- ECTS: 6 - Hours of study in total: 180 - Weekly hours per semester: 4 - Contact hours: 60 - Self-Study hours: 120 - Course characteristics: compulsory - Course frequency: every year – winter semester

	- Maximal capacity: 25 students - Course admittance prerequisites: none - Skills trained in this course: theoretical knowledge, practical skills and scientific competencies - Assessment of the course: Theoretical knowledge (40%): Written Exam at the end of the course, Practical Skills (40%): realizing a small real-world project within the lecture related topics of innovation driven software engineering and Scientific Competences (20%): written paper (literature review, approx. 10 pages) and presentation (in class or at a student conference, e.g. International Research Conference Dortmund) - Teaching staff: Prof. Dr. Sabine Sachweh, external lecturers from industry and/or partner universities, PhD students from IDiAL
7	**Learning outcomes** 7.1 Knowledge - Knows the theoretical background of the design thinking method - Knows different software development processes especially agile software development - Knows required steps and processes for agile software development - Knows how to express software architectures based on the UML Diagrams - Knows how to use tools like git, checkstyle, bug tracking and issue management systems 7.2 Skills - Can conceptualize a software based on the design thinking method - Can apply and choose between software development processes - Can setup and manage a team based on agile principles - Can work on a software development project 7.3 Competence – attitude - Can work in a team on scientific topics - Can present and defend scientific results in front of an audience - Can discuss the topics related to the lecture - Can understand related topics and translate between different domains
8	**Teaching and training methods** - Theoretical knowledge: e-learning modules on innovation driven software engineering - Practical Skills: Project work, Labs, and Exercises - Scientific Competences: extract information for a given topic in a small group and sum the results up
9	**Course mapping** Input for: MOD2-01 – Usability Engineering MOD-E03 – Human Centered Digitalization Input from: None
10	**References** Basics & Practitioner

Solving Problems with Design Thinking - Ten Stories of What Works, Jeanne Liedtka, Andrew King, Kevin Bennett, Columbia Business School Publishing, 2013

Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, Alexander Osterwalder, Yves Pigneur, John Wiley & Sons, 2010

Software Engineering, Ian Sommerville, Addison Wesley Pub Co Inc, 2015

Research (Conferences, Journals and selected papers)

ACM Special Interest Group on Design of Communication (SIGDOC)

ACM Interactions, e.g. Volume 25 Issue 3, Design Thinking, May/June 2018

Nela Murauer, Design Thinking: Using Photo Prototyping for a user-centered Interface Design for Pick-by-Vision Systems. In Proceedings of the 11th PErvasive Technologies Related to Assistive Environments Conference (PETRA '18), 2018

Eunice Sari and Adi Tedjasaputra, Design Thinking 101: A Strategy for Intelligent System Innovation. In Proceedings of the 4th International Conference on Human-Computer Interaction and User Experience in Indonesia, CHIuXiD '18 (CHIuXiD '18), 2018

Corin Walker, Tomeka Nolen, Jinlan Du, and Heather Davis, Applying Design Thinking: In Proceedings of the 2019 ACM SIGUCCS Annual Conference (SIGUCCS '19), 2019

Franziska Dobrigkeit and Danielly de Paula, Design thinking in practice: understanding manifestations of design thinking in software engineering. In Proceedings of the 2019 27th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE 2019), 2019