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Module Specification:

Scrum & Kanban (SKPM)

Within the Erasmus+ KA2 Capacity Building Project (CBHE)

CompIIT – Competences for International Innovation Projects

Project 101082806

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1 Summary

Overall Learning Outcome: Learners will learn how to plan, manage and conduct the application of agile practices especially in projects and in a virtual settings with (mainly) online collaboration. The focus of the course is on the application of Scrum and Kanban. Individual and teams will practices the methods and tools. Student teams will use agile practices for reflection on the methods and take recent scientific literature into consideration, in addition to their own team experience.

Target Group Analysis: The module addresses **Bachelor's students** with a management-oriented focus, both from technical sciences and business administration. No prior knowledge in the field of project management is required, while good IT literacy is a plus. Another target group are **practitioners** in the field of management, project management, (digital) business development and software development who seek for an introductory training.

Competences & Learning Outcomes:

- Understand projects, basic project management
- Familiarity with agile methods and tools, especially Scrum and Kanban
- Ability to manage and conduct Scrum projects and manage Kanban boards
- Develop deeper understanding of agile methods
- Ability to be effective in agile projects in different roles
- Ability to facilitate Scrum and Kanban and to reflect on efficacy and efficiency

Selection of Content:

- Introduction to Project Management
- Agility and Rationale for Application of Agile Methods
- Scrum: Roles, Ceremonies, User Stories, Methods & Tools
- Kanban: Introduction, Usage of Boards, Ticker Management, Methods & Tools
- Scrumban & Hybrid Project Management

Activities and Teaching/Learning Methods:

- Online Courses, Videos, Literature for the Knowledge Transfer (mainly online, online test)
- Online Documentation and Tutorials for IT-Tools
- Practical Exercises on Methods & Tools from Project management, Scrum and Kanban
- Plan and conduct a small Scrum project as practical assignment (groupwork)
- Conduct Scrum ceremonies: Sprint planning, Daily scrum, Sprint review & retrospective
- Project Review with teachers
- Review and discussion of selected scientific papers
- Lessons learned workshop as a reflective element (individual or group work)

Teaching Materials/Literature/Media/Technical Requirements/Lab Equipment:

IT infrastructure for virtual team collaboration and agile project management

Online learning materials, textbooks

Tailoring & Educational Tracks (Practical, Entrepreneurial, Scientific):

- Practical Track: see 3.7
- Entrepreneurial Track: see 3.7
- Scientific Track: see 3.7
- Company Track: see 3.7

Competence Assessment:

- Knowledge: oral/written exam or online test, e.g. daily quizzes
- Scrum project simulation: groupwork, reviews and final presentation
- Presentation on lessons learned workshop: (individual or group) based on reading of selected scientific literature and a guided team workshop.

Curricula Integration: Elective in the 3rd year of a Bachelor's programme, part of a specialization on IT, software or engineering projects, e.g., or as an elective. Can be tailored to be part of a project (assignment) within the curriculum, e.g. as an introduction for teachers and students (or student teams) before doing the project.

Quality Evaluation: Quality review by experts, evaluation of teaching activities

Change History & Ownership:

Release V2.0: Release Version (20.7.2024), Carsten Wolff (FH Do), Bassam Hussein (NTNU)

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2. Introduction to the module

The module "Scrum & Kanban" is intended to give students or practitioners from technical or management fields a introduction on how to manage agile projects, specifically with the methods Scrum and Kanban. The module starts with an introduction into project management, framing the term “project”, giving an overview on the development of project management and a short introduction into the main concepts and terms of traditional project management. Based an the traditional framing of projects, the core issues which led to the agile transformation are introduced and the ideas and mindset of agile methods and principles are introduced. Two agile methods or frameworks are taught in detail: Scrum (for more complex, project-like tasks which are solved by teams of 3-8) and Kanban (for managing smaller tasks and daily work). For the concepts, (online) lectures, documentation, videos and (tool) tutorials are used. The learning can be checked in an oral exam or in an online test. In addition to the theory on the processes, methods and tools, student teams of 3-5 students conduct a Scrum project in virtual collaboration as a practical project simulation, based on a realistic task, using Scrum and a set of IT tools for online collaboration and agile project management. The result is discussed and checked by the teachers in a project/sprint review with the team. The reflective and scientific part of the module is based on a Sprint Retrospective or a Lessons Learned Workshop where the team discusses the efficacy and efficiency of the methods. This is based on a selection of scientific papers which the team needs to take into account. During the project simulation, the teams already use the sprint retrospective for reflection on the team collaboration. The final Retrospective or Lessons Learned workshop is intended to put the learning into a larger context. The results are discussed and checked with the teachers. The didactic concept assumes that students can benefit from the practical learning experience when they read and understand the scientific literature. The learning experience is best when teams are mixed internationally and interdisciplinary. For the task for the team simulation, the development of a mockup or a klick-prototype of a mobile app has been feasible, no-code frameworks can be used to allow participation also for non-technical students.

The module is structured as follows:

1) Introduction to Project Management, Scrum, Kanban and Hybrid Methods (lectures)
2) Project Simulation of a Scrum project in a virtual setting (team project)
3) Reflection based on a Lessons Learned Workshop and scientific literature

3. Module Description

3.1 Overall Learning Outcomes

- **Knowledge:** Upon completion of this module, students will be able to:
  - Understand the core concepts of projects and project management.
  - Know traditional and agile project management methods.
  - Explain issues in traditional project management.
  - Know the agile frameworks/methods Scrum and Kanban.
  - Explain and compare methods for managing agile projects, especially Scrum and Kanban.
  - Explain the combination in hybrid project management approaches.
- **Skills:** Upon completion of this module, students will be able to:
  - Conduct a small project in an agile team, using Scrum in a virtual collaboration setting.
  - Apply Scrum methods and ceremonies.
  - Apply IT tools for managing Scrum projects.
  - Define team roles, especially Scrum Master and Product Owner.
  - Set up IT environments for collaboration in virtual teams.
- **Ability & Attitude:** Upon completion, students will develop the ability and attitude to:
  - Cooperate in a virtual team using online collaboration tools.
  - Develop an agile mindset.
  - Perform successfully in an virtual Scrum team and accomplish tasks.
  - Present and defend team results in a virtual environment.
  - Develop team competencies among the members.
  - Reflect on methods, processes and team situations, e.g. in a Lessons Learned workshop or a Sprint Retrospective.
  - Understand related scientific literature and consider the scientific state-of-the-art in the reflection on the Scrum project simulation.

Learning Outcomes/Competences need to consider several competence domains [4]:

- **Technical Competence**: basics of traditional project management, agile project management methods, Scrum, Kanban, Scrumban, digital literacy in online tools
- **Professional Competence**: management competences, IT skills, team-related competences, online collaboration, scientific methods (literature review & analysis)
- **Global Competence**: intercultural and international competences, communication

Overarching Learning Outcomes (EIT OLO) in Bachelor's programmes according to [5]

- Value judgments and sustainability competencies (EIT OLO 1):
  - The ability to identify the short- and long-term future consequences of plans and decisions from an integrated scientific, ethical and intergenerational perspective and to merge this into a solution-focused approach, moving towards a sustainable society.

- Entrepreneurship skills and competencies (EIT OLO 2):
  - The ability to translate ideas into prototypes and projects.
- Creativity skills and competencies (EIT OLO 3)
  - The ability to think beyond boundaries and systematically explore new ideas.
- Innovation skills and competencies (EIT OLO 4)
  - The ability to use knowledge, ideas and technology to create new or significantly improved products, services, processes, policies, new business models or jobs.
- Research skills and competencies (EIT OLO 5)
  - The ability to use basic research methods, processes and and to apply these also in cross-disciplinary teams and contexts.
- Intellectual transforming skills and competencies (EIT OLO 6)
  - The ability to transform practical experiences into research problems and challenges.
- Leadership skills and competencies (EIT OLO 7)
  - The ability of decision-making and leadership, based on a holistic understanding of the contributions of higher education, research, and business to value creation, in limited sized teams and contexts.

The module can be delivered with a mainly practical focus, as a training for Scrum Masters, Product Owners and Scrum team members, and project managers in the digital transformation domain. In addition to this (mandatory) practical part, it can be extended with a scientific element based on the scientific state-of-the-art (see 3.4). Furthermore, an entrepreneurial variant of the module with a focus on innovations and new products can be conducted.

3.2 Target Group Analysis

Bachelor students from technical sciences, e.g., informatics, engineering with a focus on related management competences:

- Studied a previous Bachelor's degree in a technical field, put focus on technology management, innovation, entrepreneurship in their Master's, want to select a management oriented elective
- Good technical background in relevant fields of digital transformation (e.g., informatics, programming, databases), some business administration knowledge
- Need a focus on the agile methods, project management and virtual collaboration in addition to their technical competences
- Competence goals: be able to set up and manage a small agile project, understand Scrum and Kanban, especially communication and collaboration
- Targeted job-field: project member in agile projects, Scrum Master, Product Owner

Bachelor students from business field, e.g., management, project management, business administration/computing/engineering with a focus agile management:

- Studied a previous Bachelor's degree in a business-related field, put focus on new digital business models, digital transformation, entrepreneurship, want to select a digital literacy and project management oriented elective
- Some technical background in relevant fields of digital transformation (e.g., informatics, programming, databases), IT literacy, some business administration knowledge
- Need a focus on the agile methods and projects in addition to their business competences
- Competence goals: be able to set up and manage a small agile project, understand Scrum and Kanban, especially communication and collaboration
- Targeted job-field: Scrum Master, Product Owner or agile coach, project manager for agile projects (business focus)

Practitioners from industry, both from business and technology field, professionals (3-5 years' experience) and (junior) executives:

- Studied a previous Bachelor's or Master's degree in a business-related or technology-related field, put focus on working in or managing projects for the development of digital products, services, or business models => need an intensive training (40-60 hours)
- Professional background in one of the relevant fields
- Need a focus on the practical competences, scientific competences are interesting but not mandatory, might need a certification
- Competence goals: be able to set up and manage an agile (Scrum) project
- Targeted job-field: Scrum Master, Product Owner or agile coach, advanced developer.

3.3 Competences & Learning Outcomes

See 3.1, split into overall learning outcomes and detailed competences and learning outcomes has to be done while refining the module ...

3.4 Content

This module provides a comprehensive understanding of Scrum and Kanban, two popular Agile frameworks, to help students grasp their roles in project management and software development. It equips students with the knowledge and practical skills to effectively apply these methodologies in real-world projects.. Basic aspects of project management, the core ideas and reasons of agile practices, and the combination of Scrum, Kanban, and traditional methods in hybrid approaches provide a framing for the module. The focus is on a practical learning experience for students without prior knowledge in the field. Basic IT literacy and business knowledge are required.

Course Structure - The module has **3 core elements**:

1) **Knowledge Transfer: Lectures**, Online Courses or Reading Materials:
    - Project Management – Introduction for Beginners
        - Overview of project management principles
        - Key roles in project management

    - Project planning and tools
    - Risk management and mitigation
- Introduction to Agile Methodologies
    - The Agile Manifesto and principles
    - Key agile methodologies: Scrum, Kanban, Lean, XP
    - Agile project lifecycle
    - Agile project metrics and continuous improvement
- Scrum Framework
    - Scrum roles: Product Owner, Scrum Master, Development Team
    - Scrum events: Sprint planning, daily stand-ups, reviews, retrospectives
    - Scrum artifacts: Product backlog, sprint backlog, increments
    - Managing Scrum in practice
- Kanban Framework
    - Kanban principles: Visualization, WIP limits, managing flow
    - Setting up and managing a Kanban system
    - Continuous delivery and process improvement
    - Metrics and tools in Kanban
- Scrum vs. Kanban: Comparative Analysis
    - Key differences between Scrum and Kanban
    - When to use Scrum vs. Kanban
    - Hybrid approaches: Scrumban
    - Case studies and real-world applications

2) **Project Simulation of a Scrum project** in a virtual setting (team project)
    a) Setting up the team and assigning the roles, especially Scrum Master and Product Owner (based on a Belbin Test for all team members and reflection on own team/project personality)
    b) Developing an idea for a mobile app (based on a selection of cases) and pitching of the idea and the project planning as a kick-off event.
    c) Conducting 2 months of (weekly) sprints, documentation and review of project artefacts
    d) Demonstration of a klick prototype and final project review

3) **Lessons Learned/Retrospective** based on selected scientific literature
    a) Introduction of a portfolio of selected scientific papers for reading
    b) Review and discussion of the recent research in the field, with a focus on the efficacy and efficiency of agile practices, especially in virtual collaboration
    c) Lessons Learned workshop or extended retrospective (3-4 h) of the teams from the Scrum project simulation (see 2))
    d) Presentation, review and discussion of the results

Furthermore, documentation for agile methods (e.g., Scrum, Kanban) and tutorials for IT tools are provided as online reading materials, video tutorials, and guidelines.

3.5 Teaching & Learning Activity Plan

A) Teaching/learning methods per competence:

- Practical Knowledge: online courses, videos, lectures, literature: books and scientific papers, recent articles from scientific journals (mainly online), tool trainings & tutorials
- Scientific State-of-the-Art: literature review and analysis
- Practical skills, professional ability & attitude: Plan and conduct an agile project with Scrum (groupwork: project simulation in teams), virtual collaboration, IT tools trainings
- Scientific competence, scientific ability: conduct a lessons learned workshop or sprint retrospective with consideration of the scientific state-of-the-art

B) Didactic concept:

- Online courses, videos, e-book, distance learning for the knowledge, possibly (virtual) lectures, provide material for further reading => use flipped/inverted classroom for discussion of topics, use exams (oral, online test) for competence assessment, especially short daily quizzes for learning progress assessment
- Project- and problem-based learning for the Scrum project:
  - based on a realistic task (e.g. mobile app development, provided by teachers or defined by students) => analysis of a partly unstructured, unsolved problem => analytical and creative skills
  - form a team and assign Scrum roles, e.g. supported by a personality test (Belbin, 16 personalities) => students reflect and understand their team personality
  - conduct Scrum sprints for several weeks, conduct sprint reviews with teachers
  - use reflective elements like sprint retrospective to assess team cooperation
- Scientific literature analysis: select, analyse and comprehend scientific knowledge => apply in a reflective learning element: lessons learned workshop, sprint retrospective

C) Learning Activity Plan:

Activity 1: Theory courses *on agile practices: intro to projects and traditional project management, agile methods: Scrum, Kanban, Scrumban, hybrid projects (24 h contact time in total, e.g. 6 x 4 h) => each session closes with a short daily quiz*

The theory courses are classroom lectures, online lectures, online courses, videos or tutorials, and reading materials (e-books, scientific papers, published media). They are conducted during the whole semester or on the first 3-4 weeks of the semester.

Activity 2: Scrum project simulation in teams *(e.g. 3-5 students) as a practical assignment (12 h contact time (sprint reviews) + 60 h team and individual work)*

Students conduct a Scrum project based on tasks or cases, e.g. as outlined below:

- *conduct a development project for a mobile app (different use cases are provided) by using a no-code development platform and IT tools for agile project management*
- *conduct a business development project for a digital product or service with a focus on the digital transformation of a business model, e.g. new digital customer journeys*
- *develop a digital media production projects, e.g. a film, a website or a game*

As part of the practical assignment students are required to work in groups (of 3-5) which use Scrum and a virtual collaboration environment (e.g., MS Teams, Atlassian Confluence, Atlassian Jira, Figma no-code platform) to develop an App, a website or a digital customer journey, with a prototype (e.g., mock-up, website, click-prototype of a mobile app). Students conduct and document several scrum sprints. The learning activities include:

- *do sprint planning, daily scrum, sprint review and sprint retrospective meetings (online)*
- *develop and test prototypes or mockups*
- *present a 20 min project release/kick off presentation and discuss with business owners*

(Scrum) Roles can be assigned based on a personality test (e.g., Belbin, 16 personalities) in a team discussion. Students produce the relevant project documents and artefacts.

Activity 2 can be conducted in an intensive block week, e.g. summer school. In that case, activity 1 has to be finished beforehand. Activity 3 concludes the block week.

***Alternative A for Activity 2: similar Scrum project in a company** (e.g. 2 weeks - 1 month) with a project presentation and review of the project artefacts (e.g., product backlog, sprint planning, documentation of sprint reviews and retrospectives)*

***Activity 3: project review & team presentations**: a "project review presentation" (extended sprint review & retrospective are provided on activity 2 (see above). The discussion with the project teams can be extended into an oral exam (1 h per team, presentation in classroom, e.g. 8 teams = 8 h contact time, 10 h for team and individual work for preparation)*

***Alternative B for Activity 3:** Present a project case from internship or own job*

***Activity 4: Lessons Learned Workshop (group work) or Project Retrospective (individual homework)**: reading and analysing a set of scientific papers (provided by teachers) on agile methods, especially Scrum and Kanban (16 h contact time + 20 h team and individual work)*

Students are introduced to the topic and receive trainings on scientific methodology, especially scientific review and analysis of papers (4 h contact time).

Students read the papers and take notes (10 h individual work)

Students prepare and conduct the lessons learned workshop (10 h team and individual work). Contact time is used in individual consulting and intermediate reviews (e.g. 4 x 2 h = 8 h contact time).

Students present and discuss their findings and conclusions in a review meeting (8 h contact time, e.g. 8 teams with 1h per team). The discussion is combined with oral exams.

3.6 Teaching & Learning Resources

- Textbooks:
  - Scrum: The Art of Doing Twice the Work in Half the Time by Jeff Sutherland
  - Kanban: Successful Evolutionary Change for Your Technology Business by David J. Anderson
  - Essential Scrum: A Practical Guide to the Most Popular Agile Process by Kenneth S. Rubin
  - Kanban from the Inside by Mike Burrows
- Guides and Frameworks:
  - Scrum Guide (available online from the official Scrum.org website)
  - Kanban Guide for Scrum Teams (from Scrum.org)
  - Agile Manifesto and associated principles
- Videos/Documentaries:
  - YouTube channels like: Scrum.org, Atlassian, or Scrum Alliance for introductory and advanced Scrum & Kanban videos.
  - TED talks on Agile, Scrum, and Lean management.
  - Documentaries on agile transformation in businesses.
- Learning Management System, e.g. moodle
- Collaboration and video conferencing platform, e.g. MS Teams
- IT tools for agile projects management, e.g., Atlassian Confluence, Jira, MS Planner
- System for online surveys, checklists and usability tests, e.g. google forms

3.7 Tailoring & Educational Tracks

Educational Tracks support the tailoring of the module to specific target groups:

- Practical: In order to focus the module on practical skills, learning activity 4 could be omitted and the learning activities 2 and 3 could be extended, e.g. by involving companies, by using a challenge-based approach, or by switching to alternative A and/or B.
- Entrepreneurial: In order to focus the module on entrepreneurial skills, the practical assignment could be a start-up project, an innovation project, or the development of a new business model. Learning activity 3 and 4 could focus on topics like a market research or a customer test, instead of a lessons learned review. Pitching techniques could be used for the presentation and a jury could take the role of an investor or customer.
- Scientific: In order to focus the module on scientific competences, the theoretical part (e.g. in learning activity A) could be increased by looking deeper into current research. The learning activities 2 and 3 could be omitted, or focussed on a joint research project. If they are done, an scientific evaluation of certain aspects could be conducted. In general, activity 4 could be expanded.
- Company: In order to convert the module into a training in a company, learning activity 1 could be conducted as a 2-3 days training instead of classes.

3.8 Assessment Methods

FORM	%	REMARK
Knowledge: Oral or written exam, online test, daily quizzes	30	Based on theory classes
Groupwork: simulation of an virtual Scrum project => project reviews	20	Project (sprint) reviews are conducted by teachers/industry experts
Team presentation and oral exam: project & product/prototype	30	15-20 min presentation to teachers, experts, or jury, discussion, oral exam
Groupwork or individual homework: scientific literature analysis and lessons learned workshop => presentation and discussion	20	15-20 min presentation to teachers, discussion, oral exam

3.9 Curricula Integration

Integrate in which study programs?

- Project Management, Informatics, Digital Transformation, Business Computing, Business Engineering
- FH Dortmund: Bachelor programmes in Informatics, Information Technology or Business Administration (also International Business)

How to integrate into the curriculum?

- FH Dortmund: Elective (5-6 ECTS) in 3rd year, presence/workshop in block week, e.g., Spring School, Summer School

3.10 Quality Assurance - Evaluation

Quality assurance - Evaluation

- expert review and release of specification and module by IEB/QMB
- pilot teaching with peer review and evaluation survey (students, teachers)
- via student survey after each teaching of the module
- after curriculum integration: accreditation review

4. Syllabus/Module Handbook

<table>
<tr><td colspan="7">Scrum & Kanban (SKPM)</td></tr>
<tr><td colspan="2">Module Owner
xxx</td><td>Workload
180 h</td><td>Credits
6 ECTS</td><td>Semester
5</td><td>Frequency
any semester</td><td>Duration
1 Semester</td></tr>
<tr><td>1</td><td colspan="2">Course Title
Scrum & Kanban</td><td colspan="2">Contact hours
4 hours per week /
60 h in total</td><td>Self-Study
120 h</td><td>Planned Group Size
25 students</td></tr>
<tr><td>2</td><td colspan="6">Course Description

This module provides a comprehensive understanding of Scrum and Kanban, two popular Agile frameworks, to help students grasp their roles in project management and software development. It equips students with the knowledge and practical skills to effectively apply these methodologies in real-world projects.. Basic aspects of project management, the core ideas and reasons of agile practices, and the combination of Scrum, Kanban, and traditional methods in hybrid approaches provide a framing for the module. The focus is on a practical learning experience for students without prior knowledge in the field. Basic IT literacy and business knowledge are required.</td></tr>
<tr><td>3</td><td colspan="6">Course Structure

The module has 3 core elements:

Knowledge Transfer: Lectures, Online Courses or Reading Materials:

• Project Management – Introduction for Beginners
a) Overview of project management principles
b) Key roles in project management
c) Project planning and tools
d) Risk management and mitigation
• Introduction to Agile Methodologies
a) The Agile Manifesto and principles
b) Key agile methodologies: Scrum, Kanban, Lean, XP
c) Agile project lifecycle
d) Agile project metrics and continuous improvement
• Scrum Framework
a) Scrum roles: Product Owner, Scrum Master, Development Team
b) Scrum events: Sprint planning, daily stand-ups, reviews, retrospectives
c) Scrum artifacts: Product backlog, sprint backlog, increments
d) Managing Scrum in practice
• Kanban Framework
a) Kanban principles: Visualization, WIP limits, managing flow
b) Setting up and managing a Kanban system
c) Continuous delivery and process improvement
d) Metrics and tools in Kanban</td></tr>
</table>

	• Scrum vs. Kanban: Comparative Analysis a) Key differences between Scrum and Kanban b) When to use Scrum vs. Kanban c) Hybrid approaches: Scrumban d) Case studies and real-world applications **Project Simulation of a Scrum project** in a virtual setting (team project) • Setting up the team and assigning the roles, especially Scrum Master and Product Owner (based on a Belbin Test for all team members and reflection on own team/project personality) • Developing an idea for a mobile app (based on a selection of cases) and pitching of the idea and the project planning as a kick-off event. • Conducting 2 months of (weekly) sprints, documentation and review of project artefacts • Demonstration of a klick prototype and final project review **Lessons Learned/Retrospective** based on selected scientific literature • Introduction of a portfolio of selected scientific papers for reading • Review and discussion of the recent research in the field, with a focus on the efficacy and efficiency of agile practices, especially in virtual collaboration • Lessons Learned workshop or extended retrospective (3-4 h) of the teams from the Scrum project simulation (see 2)) • Presentation, review and discussion of the results
4	**Application Focus** Scrum project simulation in teams (e.g. 3-5 students) as a practical assignment (12 h contact time (sprint reviews) + 60 h team and individual work) Students conduct a Scrum project based on tasks or cases, e.g. as outlined below: • conduct a development project for a mobile app (different use cases are provided) by using a no-code development platform and IT tools for agile project management • conduct a business development project for a digital product or service with a focus on the digital transformation of a business model, e.g. new digital customer journeys • develop a digital media production projects, e.g. a film, a website or a game As part of the practical assignment students are required to work in groups (of 3-5) which use Scrum and a virtual collaboration environment (e.g., MS Teams, Atlassian Confluence, Atlassian Jira, Figma no-code platform) to develop an App, a website or a digital customer journey, with a prototype (e.g., mock-up, website, click-prototype of a mobile app). Students conduct and document several scrum sprints. The learning activities include: • do sprint planning, daily scrum, sprint review and sprint retrospective meetings (online) • develop and test prototypes or mockups • present a 20 min project release/kick off presentation and discuss with business owners (Scrum) Roles can be assigned based on a personality test (e.g., Belbin, 16 personalities) in a team discussion. Students produce the relevant project documents and artefacts. Alternative A: similar Scrum project in a company (e.g. 2 weeks - 1 month) with a project presentation and review of the project artefacts (e.g., product backlog, sprint planning, documentation of sprint reviews and retrospectives) Project review & team presentations: a “project review presentation” (extended sprint review &

	retrospective are provided on activity 2 (see above). The discussion with the project teams can be extended into an oral exam (1 h per team, presentation in classroom, e.g. 8 teams = 8 h contact time, 10 h for team and individual work for preparation) Alternative B: Present a project case from internship or own job
5	**Scientific Focus** Lessons Learned Workshop (group work) or Project Retrospective (individual homework): reading and analysing a set of scientific papers (provided by teachers) on agile methods, especially Scrum and Kanban (16 h contact time + 20 h team and individual work) Students are introduced to the topic and receive trainings on scientific methodology, especially scientific review and analysis of papers (4 h contact time). Students read the papers and take notes (10 h individual work) Students prepare and conduct the lessons learned workshop (10 h team and individual work). Contact time is used in individual consulting and intermediate reviews (e.g. 4 x 2 h = 8 h contact time). Students present and discuss their findings and conclusions in a review meeting (8 h contact time, e.g. 8 teams with 1h per team). The discussion is combined with oral exams.. Methods are: Literature review, literature analysis, lessons learned method.

6	**Parameters**
	
	• ECTS: 4+2 (tailoring option: with (6 ECTS) or without Lessons Learned/Retrospective (4 ECTS))
	• Hours of study in total: 180
	  – Weekly hours per semester: 4
	  – Contact hours: 60
	  – Self-Study hours: 120
	• Course characteristics: elective
	• Course frequency: every year - summer semester (3rd year)
	• Maximal capacity: 25 students
	• Course admittance prerequisites: digital literacy, basic business and IT knowledge
	• Skills trained in this course: theoretical, practical and scientific skills and competences;
	• Assessment of the course: online test or oral exam on theoretical content (30%), contributions within the Scrum project simulation (team presentation + oral exam) (50%) and presentation, review and discuss of the lessons learned/retrospective (20%)
	• Teaching staff: teachers from Open Community of Practice

7	**Learning outcomes** Knowledge and understanding: The students • understand the core concepts of projects and project management. • know traditional and agile project management methods. • explain issues in traditional project management. • know the agile frameworks/methods Scrum and Kanban. • explain and compare methods for managing agile projects, especially Scrum and Kanban. • explain the combination in hybrid project management approaches

	Skills: Upon completion of this module, students will be able to • Conduct a small project in an agile team, using Scrum in a virtual collaboration setting. • Apply Scrum methods and ceremonies. • Apply IT tools for managing Scrum projects. • Define team roles, especially Scrum Master and Product Owner. • Set up IT environments for collaboration in virtual teams Ability & Attitude: Upon completion, students will develop the ability and attitude to • Cooperate in a virtual team using online collaboration tools. • Develop an agile mindset. • Perform successfully in an virtual Scrum team and accomplish tasks. • Present and defend team results in a virtual environment. • Develop team competencies among the members. • Reflect on methods, processes and team situations, e.g. in a Lessons Learned workshop or a Sprint Retrospective. • Understand related scientific literature and consider the scientific state-of-the-art in the reflection on the Scrum project simulation
8	**Teaching and training methods** Students will be guided through a case study project. They form agile teams and collaborate in the project execution via IT tools. In addition, they write a scientific paper as group work. • Lectures introducing concepts, methods and tools • Project simulation (agile, virtual SW development projects with Scrum)on the case study of a mobile app development, in mixed teams with SW developers from another international Master's programme. Several sprints are conducted over 2 months' time. Review meetings with teachers and 2 reviews in the plenary. • Group work on writing a scientific paper, peer review by students and teachers • Presentations to communicate results
9	**Curricula Integration** Elective, e.g. in 3rd year
10	**References** • Breyter, Mariya (2022): Agile Product and Project Management: A Step-by-Step Guide to Building the Right Products Right, 1st ed. Edition, Apress • Louis, Raymond (2006). Custom Kanban: Designing the System to Meet the Needs of Your Environment. University Park, IL: Productivity Press. ISBN 978-1-56327-345-2 • David J. Anderson (2010): Kanban: Successful Evolutionary Change for Your Technology Business, Blue Hole Press • Mike Burrows (2014): Kanban from the Inside: Understand the Kanban Method, connect it to what you already know, introduce it with impact, Blue Hole Press • Schwaber, Ken; Sutherland, Jeff (2020): The Scrum Guide - The Definitive Guide to Scrum: The Rules of the Game, online https://www.scrum.org/resources/scrum-guide • Kenneth S. Rubin (2012): Essential Scrum: A Practical Guide to the Most Popular Agile Process, Addison-Wesley Signature • Kniberg, Henrik; Skarin, Mattias (2009). Kanban and Scrum - Making the Most of Both. Info-Q. ISBN 978-0-557-13832-6 • Martin, Robert C. (2014): Agile Software Development, Principles, Patterns, and Practices,

	First Edition, Pearson New International Edition, Pearson • Atlassian: The Agile Coach: https://www.atlassian.com/agile, last visited March 31, 2024 • Agile Alliance: https://www.agilealliance.org/, last visited March 31, 2024 • Scrum.org: https://www.scrum.org/, last visited March 31, 2024 • Scrum Alliance: https://www.scrumalliance.org/, last visited March 31, 2024 • Project Management Institute (PMI) (2017): Agile Practice Guide, online www.pmi.org • International Project Management Association (IPMA) (2018): IPMA Reference Guide ICB4 in an Agile World, online www.ipma.world • Lous, Pernille; Kuhrmann, Marco; Tell, Paolo (2017): Is Scrum Fit for Global Software Engineering? 2017 IEEE 12th International Conference on Global Software Engineering (ICGSE), IEEE Xplore

5. References

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[2] EU: Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), https://enqa.eu/index.php/home/esg/, Brussels, Belgium, 2015

[3] Gruen, G.; Tritscher-Archan, S.; Weiß, S.: Guidelines for the Description of Learning Outcomes, ZOOM partnership (www.zoom-eqf.eu), 2009

[4] Rajala, S.A.: Beyond 2020: Preparing Engineers for the Future. Proceedings of the IEEE, Vol. 100, pp. 1376-1383, DOI 10.1109/JPROC.2012.2190169, 2012

[5] European Institute of Innovation and Technology (EIT), “Quality for learning” EIT Quality Assurance and Learning Enhancement Model, https://eit.europa.eu/sites/default/files/eit_label_handbook.pdf, 2016