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Module Specification:

Agile Management in Virtual Project Environments (AMVPE)

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 and conduct an agile software development project in a virtual setting with (mainly) online collaboration. They will learn how virtual collaboration is affected by the soft factors, the individual team personalities, and the team dynamics. The teams will use agile practices for reflection. The module involves becoming familiar with both the recent literature on virtual team collaboration in agile software development projects, and with realistic cases and own team experience.

Target Group Analysis: The module addresses **Master's students** with a management-oriented focus, both from technical sciences and business administration. Sufficient prior knowledge in the field of agile project management and IT literacy is required, in addition familiarity with soft factors and team collaboration. Another target group are **practitioners** in the field of management, project management, (digital) business development and software development.

Competences & Learning Outcomes:

- Understand virtual collaboration settings in agile software development
- Familiarity with agile project management, especially Scrum, DevOps
- Ability to plan, lead and conduct virtual, agile projects
- Develop deeper understanding of soft factors in team collaboration and team personalities
- Ability to facilitate online collaboration, solve conflicts, reflect as a team
- Ability to be effective in agile software development project in different roles

Selection of Content:

- Introduction to Software Engineering Processes
- Introduction to Agile practices, e.g., Scrum, DevOps
- Training on IT tools for virtual project collaboration
- Project Simulation of an Agile SW Development Project in a virtual setting
- Research Seminar on virtual collaboration in agile cross-border SW development projects

Activities and Teaching/Learning Methods:

- Online Courses, Videos, Literature for the Knowledge Transfer (mainly online)
- Development of ideas for digital product and service innovations
- Plan and conduct an agile software development project in virtual collaboration as practical assignment (groupwork)
- Conduct Scrum ceremonies: Sprint planning, Daily scrum, Sprint review & retrospective
- Present results and key learnings to jury
- Write a scientific paper (individual or group work)
- Review scientific papers of other groups

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

IT infrastructure for virtual team collaboration, no-code software development tools.

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
- Project simulation: groupwork, reviews and final presentation
- Scientific paper: homework (individual or group) written based on deductive methods (literature review), review, review results for other papers.

Curricula Integration: Elective in the 2nd or 3rd semester of a Master programme, part of a specialization on Agile Project Management or Agile Software Development, e.g., an educational package on software development, project management, or team collaboration.

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 "Agile Management in Virtual Project Environments" is intended to give students or practitioners from technical or management fields a deeper insight on how to manage the agile teams which are collaboration online, in virtual settings, cross-organisational or cross-border. It is not a technical module but a managerial module, despite putting the focus on agile software development. From the agile methodology, especially Scrum (in-depth), Kanban, Scrumban, and DevOps are used. In addition, core principles of usability engineering and agile testing are covered. In addition to the theory on the processes, methods and tools, student teams of 3-5 students conduct an agile software development project in virtual collaboration as a practical project simulation, based on a realistic case study (e.g., App or website development), using scrum and a set of IT tools for online collaboration and agile project management. The reflective and scientific part of the module put the focus on the soft factors, specifically the influence of soft factors and personality traits on online collaboration and the usefulness of project management frameworks in such situations. During the project simulation, the teams use the sprint retrospective for reflection on the team collaboration. In addition, a scientific research seminar is conducted where students analyse the scientific literature on aspects of virtual team collaboration, with our without agile practices. This research leads to a scientific paper which the student teams need to produce, based on a literature review. The paper is judged in a scientific review process where both the teachers and other student teams assess the paper and suggest improvements. 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 App and website development, no-code frameworks are used to allow participation also for non-technical students.

The module is structured as follows:

1) Introduction to Software Engineering Processes (lectures)
2) Project Simulation of an Agile SW Development Project in a virtual setting (team project)
3) Research Seminar on virtual collaboration in agile cross-border SW development projects

3. Module Description

3.1 Overall Learning Outcomes

- **Knowledge:** Upon completion of this module, students will be able to:
  - Understand the core issues of agile projects.
  - Know software development and deployment concepts and processes, such as DevOps and CI/CD.
  - Explain methods for user participation in the software development process.
  - Understand cooperation in virtual teams using collaboration tools.
  - Explain and compare methods for managing agile projects, especially Scrum and Kanban.
  - Explain and compare workflows and design flows for agile projects.
- **Skills:** Upon completion of this module, students will be able to:
  - Conduct a software development project in an agile team, using Scrum in a virtual collaboration setting.
  - Apply tools for managing software development projects.
  - Develop tailored processes for managing software development 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.
  - Handle complexities while working in groups.
  - Present and defend team results in a complex virtual environment.
  - Develop team competencies among the members.
  - Perform successfully in an agile virtual team and accomplish tasks.
  - Reflect on team situations, address resulting issues, and find solutions.
  - Cooperate with a team of software developers from other Master's programs and manage interdisciplinary work successfully.
  - Manage teams and projects in intercultural and international settings.
  - Compile findings and literature reviews into scientific papers on virtual team collaboration in agile cross-border projects.

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

- **Technical Competence**: agile project management methods, Scrum, DevOps, development of digital prototypes, business model analysis (e.g., business model canvas), digital literacy in online collaboration tools
- **Professional Competence**: management competences, IT skills, team-related competences, online collaboration, scientific methods (literature review, paper review)
- **Global Competence**: intercultural and international competences, communication

Overarching Learning Outcomes (EIT OLO) in Masters 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 innovations into feasible business solutions.
- Creativity skills and competencies (EIT OLO 3)
  - The ability to think beyond boundaries and systematically explore and generate 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 cutting-edge research methods, processes and techniques towards new venture creation and growth 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 change managers, change agents 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 recent research in the respective thematic fields (see 3.4). Furthermore, an entrepreneurial variant of the module with a focus on business model changes and disruption can be conducted.

3.2 Target Group Analysis

Master 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), sound project management competence, some business administration knowledge

- Need a focus on the agile transformation, project management and people management in addition to their technical competences
- Competence goals: be able to set up and manage a virtual cross-border project, understand the soft factors, especially communication and collaboration
- Targeted job-field: project manager for agile SW development projects

Master 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 in their Master's, want to select a digital literacy and technology oriented elective
- Some technical background in relevant fields of digital transformation (e.g., informatics, programming, databases), sound project management competence, some business administration knowledge
- Need a focus on the agile transformation in addition to their business competences
- Competence goals: be able to set up and manage a virtual cross-border project, understand the soft factors, 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 managing virtual cross-border teams 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 a virtual cross-border 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 course offers students a systematic approach to the agile management of projects, specifically software development projects. As the main example case, the development of software in virtual team environments using agile methodology is considered. This is part of Software Engineering Methodology, User Centered Design Methodology and Project Management Methodology. The intention of the course is to prepare the students on managing

complex software development projects with distributed teams. The focus is the introduction of modern software development processes and the discussion of the implication of these processes on project management. One core aspect is the consideration of the recent and ongoing research on virtual collaboration in cross-border teams. Basic aspects of agile methods and practices are not the focus of this advanced course, but a refresher course on Scrum and reading materials about agile practices are provided.

Course Structure - The module has 3 core elements:

4) Introduction to Software Engineering Processes (lectures)
   a) Introduction to Agile Software Development (SW) Projects
   b) Refresher Course on Scrum
   c) Software Engineering Methodology, esp. DevOps, CI/CD
   d) User Centered Design

5) Project Simulation of an Agile SW Development 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

6) Research Seminar on virtual collaboration in agile cross-border SW development projects
   a) Introduction to scientific methodology, especially literature reviews and paper writing
   b) Review and discussion of the recent research in the field, selection of topics for own paper
   c) Preparation of a scientific paper in group work (ca. 2 months)
   d) Peer review of the papers and assessment
   e) (if possible) submission to a scientific conference and presentation

Furthermore, documentation for agile methods (e.g., Scrum, Kanban, SAFe, DevOps) 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:

- Knowledge: online courses, videos, lectures, literature: books and scientific papers, recent articles from scientific journals (mainly online), tool trainings & tutorials
- Knowledge and scientific methods: literature review and paper writing
- 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: Write a scientific paper on virtual team collaboration and agile practices (individual or group work), review and assess papers

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 (written, oral, online test) for competence assessment
- Project- and problem-based learning for the virtual agile project:
  - based on a realistic case study (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 research and writing: training on research methods, conduct literature review (choose methods), write the paper, peer review by other student teams => motivate to publish result as scientific paper (+ open data)

C) Learning Activity Plan:

Activity 1: Theory courses *on agile practices (refresher course on Scrum), agile software development and virtual teams (18 h contact time in total, e.g. 3 x 6h)*

The theory courses are 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: virtual, agile 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 an agile software development project based on the types of cases outlined below:

- *conduct a SW development project for an 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 start-up project with a focus on a new, disruptive digital product or service*

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, based on an analysis of the as-is-situation (e.g., market analysis, technology assessment). They develop a product or service idea or the future to-be-situation (e.g. a new digital business model) and set up a Scrum project for the implementation of a prototype (e.g., mock-up, website, click-prototype of an 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*
- *develop a business model canvas and a marketing plan*
- *present a 20 min project release/kick off presentation and discuss with business owners*

(Scrum) Roles are 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: Project internship 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: team presentations**: a "customer presentation of the project result" and a "project lessons learned presentation" 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)*

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

***Activity 4: Group or individual homework**: writing a scientific paper on virtual collaboration in agile software development, especially on the soft factors with respect to the online communication settings (8 h contact time + 60 h individual work)*

Students are introduced to the topic and receive trainings on scientific methodology, especially conducting literature reviews, paper writing, and scientific review of papers.

Students write a scientific paper on a given topic or an approved (industry/real) case (can be provided an industry partner, by university or submitted by student) by using mainly deductive methods based on literature review and paper writing methods.

Students have to gather additional relevant literature.

Contact time is used in individual consulting and intermediate reviews (e.g. 3 x 2 h = 6 h).

Activity 5: review of the scientific papers

The scientific paper will be submitted to the reviewers. Papers will be reviewed by the teachers and by 2 (other) student teams. The reviews are provided to the teams for improvement of the paper. Excellent papers will be submitted to scientific conferences.

(To do: Describe predefined "student journeys" through the module, link it to learning trajectories and competence development paths.)

3.6 Teaching & Learning Resources

- 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
- IT tools for no-code development, e.g. Figma
- 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 and 5 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 4 and 5 could focus on topics like a market research or a customer test, instead of a scientific topic. 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 and 5 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. Learning activity 4 and 5 could be omitted or shortened to a individual or team reflection session. Learning activity 2 and 3 could be conducted as described in alternative A and B.

3.8 Assessment Methods

FORM	%	REMARK
Knowledge: Oral or written exam, online test	20	Based on theory classes
Groupwork: simulation of an virtual agile project => project reviews	30	Project reviews are conducted by teachers/industry experts
Team presentation and oral exam: project, idea for product/service/startup, prototype and business case	20	15-20 min presentation to jury, discussion, oral exam
Groupwork or individual homework: write a scientific paper on virtual collaboration projects and agility	30	Assessment by doing reviews: 2 reviews from experts (teachers) and 2 peer-reviews (other student teams)

3.9 Curricula Integration

Integrate in which study programs?

- Project Management, Informatics, Digital Transformation, Business Computing, Business Engineering
- FH Dortmund: European Master in Project Management (EuroMPM), Master Digital Transformation (MDT)

How to integrate into the curriculum?

- FH Dortmund: Elective (6 ECTS) in 2nd or 3rd semester, 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">Agile Management in Virtual Project Environments (AMVPE)</td></tr>
<tr><td colspan="2">Module Owner
xxx</td><td>Workload
180 h</td><td>Credits
6 ECTS</td><td>Semester
2</td><td>Frequency
any semester</td><td>Duration
1 Semester</td></tr>
<tr><td>1</td><td colspan="2">Course Title
Agile Management in Virtual Project Environments</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 course offers students a systematic approach to the agile management of projects, specifically software development projects. As the main example case, the development of software in virtual team environments using agile methodology is considered. This is part of Software Engineering Methodology, User Centered Design Methodology and Project Management Methodology. The intention of the course is to prepare the students on managing complex software development projects with distributed teams. The focus is the introduction of modern software development processes and the discussion of the implication of these processes on project management. One core aspect is the consideration of the recent and ongoing research on virtual collaboration in cross-border teams. Basic aspects of agile methods and practices are not the focus of this advanced course, but a refresher course on Scrum and reading materials about agile practices are provided.</td></tr>
<tr><td>3</td><td colspan="6">Course Structure

The module has 3 core elements:

1) Introduction to Software Engineering Processes (lectures)
a) Introduction to Agile Software Development (SW) Projects
b) Refresher Course on Scrum
c) Software Engineering Methodology, esp. DevOps, CI/CD
d) User Centered Design

2) Project Simulation of an Agile SW Development 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) Research Seminar on virtual collaboration in agile cross-border SW development projects
a) Introduction to scientific methodology, especially literature reviews and paper writing
b) Review and discussion of the recent research in the field, selection of topics for own</td></tr>
</table>

	paper c) Preparation of a scientific paper in group work (ca. 2 months) d) Peer review of the papers and assessment e) (if possible) submission to a scientific conference and presentation
4	**Application Focus** The practical skills are trained by conducting an **agile SW development project based on a real-world case study**. Students form teams of 3-5, partly based on personality test (Belbin) and the description of Scrum roles (Scrum Master, Product Owner, Developer). Several case studies are provided to the student teams, but student can also propose their own topics. The project (simulation) is conducted fully online. The following case studies are examples: • conduct a SW development project for an 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 start-up project with a focus on a new, disruptive digital product or service As part of the practical assignment students are required to work in groups (of 3-5) which do an analysis of the as-is-situation (e.g., market analysis, technology assessment), develop a product or service idea or the future to-be-situation (e.g. a new digital business model) and set up a Scrum project for the implementation of a prototype (e.g., mock-up, website, click-prototype of an 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 • develop a business model canvas and a marketing plan • present a 20 min project release/kick off presentation and discuss with business owners
5	**Scientific Focus** For the scientific component, students write a **scientific research paper** about a recent topic with relevance to virtual team cooperation and agile methods. A first selection of relevant scientific literature is provided. Students are trained in scientific research methods – especially literature review and paper writing – with small methodology trainings and literature on the relevant scientific methodology. The papers are submitted for internal review. Papers are reviewed by teachers and in addition by other student teams. For this purpose, students get training on reviewing conference papers. Very good papers can be submitted to upcoming scientific conferences. Methods are: Literature review, deductive own research based on the literature, paper writing, scientific reflection and discussion in the teams, review of scientific papers.

6	**Parameters**
	
	• ECTS: 4+2 (tailoring option: with (6 ECTS) or without research seminar (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
	• Maximal capacity: 25 students

	• Course admittance prerequisites: prior knowledge of project management and agile principles and practices, advanced digital literacy, basic scientific methods • Skills trained in this course: theoretical, practical and scientific skills and competences; • Assessment of the course: online test or oral exam on theoretical content (20%), contributions within the agile project simulation (team presentation) (50%) and written paper (literature review, report or survey, approx. 6-8 pages) and presentation (in class or at a student conference) (30%) • Teaching staff: teachers from Open Community of Practice
7	**Learning outcomes** Knowledge and understanding: The students • understand core issues of agile projects • know software development and deployment concept and processes, e.g., DevOps, CI/CD • can explain methods for user participation in the software development process • understand cooperation in virtual teams with collaboration tools • can explain and compare methods for managing agile projects, esp. Scrum, Kanban • explain and compare workflows and design flows for agile projects Application and generation of knowledge: The students are able to • conduct a software development project in an agile team, using scrum in a virtual collaboration setting • apply tools for management of software development projects • develop tailored processes for managing software development projects • define the team roles, especially Scrum Master and Product Owner • setup IT environments for collaboration in virtual teams Communication and cooperation: The students have the ability to • cooperate in a virtual team via online collaboration tools • develop an agile mindset • can handle complexities while working in groups • are able to present and defend team results in a complex virtual environment • develop team competencies among the members Scientific self-understanding / professionalism: The students develop the attitude to • perform successfully in an virtual agile team and accomplish tasks • reflect on team situations, resulting issues and ways to solve such issues • cooperate with team of software developers (from other Master's programme) and manage interdisciplinary work successfully • manage teams and projects in intercultural and international settings • compile findings and literatures reviews into scientific papers on virtual team collaboration in agile cross-border projects
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 2nd or 3rd semester
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 • Rose, Robert F. (2022): Software Development Activity Cycles: Collaborative Development, Continuous Testing and User Acceptance, 1st ed. Edition, Apress • 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 • 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 • Scaled Agile Framework, SAFe 6.0: https://scaledagileframework.com/, 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 • Hummel, Markus; Rosenkranz, Christian; Holten, Roland (2013): The Role of Communication in Agile Systems Development - An Analysis of the State of the Art, Business & Information Systems Engineering 5 • Šmite, Darja; Moe, Nils Brede; Gonzalez-Huerta, Javier (2021): Overcoming cultural barriers to being agile in distributed teams. Information and Software Technology, 138 • Saunders, Mark; Lewis, Philip; Thornhill, Adrian (2019): Research Methods for Business Students, 8th edition, Pearson

5. References

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