Title	Software development for start-up entrepreneurs
Contact Hours	2
ECTS Credits	3
Semester	6
Lecturer/s	Prof. Dr. R. Lämmel
Partner Lecturer/s (cooperating)	N/A
Related Courses	N/A
Quarter	IV
Language of Instruction	English
Study Program	Bachelor of Science
Module	General Studies
Course Content	The course takes the students through several major aspects of software development. The selection of topics and the style of teaching caters, without complete loss of generality, for the perspective of start-up entrepreneurs. The objective is to support students in a possible future role as entrepreneurs in a start-up such that they can interact with developers at a technical level with sufficient understanding of the underlying concepts, technologies, and thought processes. The following topics are covered. Initially, the conceived software system of the start-up needs to be modeled in terms of the problem-specific structure and behavior of interest. To this end, UML is used. Eventually, the software system needs to be designed, implemented, and deployed along multiple technological dimensions: database, GUI-based functionality, web, apps, and APIs. In terms of programming technologies, the Python programming language and the MongoDB document-oriented database system are used. Python comes with a rich eco-system in terms of APIs, web-programming support, etc. An agile software development methodology is exercised in the course. The students are assumed to be generally interested in IT and somewhat prepared for a technical discussion of software development, but there is no firm dependence on existing programming or software engineering knowledge. Accordingly, such knowledge will be provided throughout the course in a crosscutting manner. Also, the course favors mockups and prototypes over of fully developed systems. Other crosscutting concerns of the course are software modeling and business analytics.
Prerequisites	Substantial interest in IT and software development
Grading	There is no written or oral exam. Instead, students work continuously on a project with interim presentations throughout the course and a final presentation at the end of the course. The final grade is computed as follows: 25% interim presentation, 25% final

	presentation, 50% deliverables (such as models, code, mockup designs, or documentation). Students work in small teams. Students need to actively participate in team presentations to successfully complete the course. Students are supposed to declare their specific contributions to the deliverables.	
Teaching Methods	The course relies on fewer than average slide-based presentations. Instead, much of the concepts are taught through examples. In particular, *live coding* is used to a large extent. All material is available online -- typically in the form of documented and running software systems. The course is highly interactive. In particular, students are supposed to present aspects of their emerging course project – a software system for a conceived start-up. The findings of the students are then discussed elaborately in class for the benefit of all students.	
Applied Theories and Methods	- UML modeling language - Agile software development methodology - Python programming language - MongoDB document-oriented database system - Web services, Web APIs	
Basic Reading	Part of the technical content is available through the wiki http://101companies.org/ Students are provided with specific pointers to online technical documentation and blog posts, etc. during the lectures.	
Optional Reading	Students are provided with links to online available reading material such as open books and scholarly papers during the lectures .	
Learning Goals:	Weighting:	Learning Objectives: *(please mark with the cross if applicable)*
Discipline-specific knowledge and competence	35%	☒ Possess an intermediate level knowledge in the functional areas of business ☐ Possess an intermediate level knowledge in the functional areas of economics ☒ Intermediate capacity to conduct statistical analysis and apply appropriate inference tools in data analysis
Global business environment	0%	☐ Gained experience in studying abroad ☐ Possess an intermediate level knowledge in the functional areas of international business and economics ☐ Gained practical work experience in an international environment ☐ Advanced capacity to communicate in two foreign

		languages, both orally and in writing
Critical thinking and problem-solving skills	35%	☒ Intermediate ability to integrate different perspectives ☒ Intermediate ability to implement solutions ☒ Intermediate ability to identify problems, to structure complexity and to focus on core challenges ☒ Intermediate capacity to prepare written reports about the analysis and solution of management decision problems and to deliver oral presentations at a technical level to the audience
Management-specific skills	15%	☒ Achieve an intermediate integrated perspective of the firm ☒ Have an intermediate ability to formulate strategies
Teamwork and responsible leadership	15%	☒ Possess an intermediate level knowledge in the functional areas of leadership and organization ☐ Intermediate ability to identify ethical problems arising in modern economic and business practices, and judge values/criteria/decisions/outcomes pertaining to them ☐ Intermediate capacity to incorporate an understanding of social and legal issues in reaching business related decisions ☒ Intermediate capacity to collaborate within working teams
Managerial and entrepreneurial practice	0 %	☐ Gained practical experience in student initiatives ☐ Gained practical work experience
Learning Outcomes	Understand basics of software development Understand basics of design, programming and databases Be able to communicate with software engineers Master exemplary programming technologies	

	Understand software side of a start-up effort