

## Module: Innovative Technologies in Construction (RWTH)

<b>Module</b>	Innovative Technologies in Construction
<b>Module ID</b>	3021235
<b>Module level</b>	Master
<b>Subtitle</b>	ITC
<b>Lecture</b>	See list of lectures and examinations of the module
<b>Semester allocation</b>	3
<b>Person in charge</b>	Univ.-Prof. Dr. -Ing Katharina Klemt-Albert
<b>Lecturer</b>	Univ.-Prof. Dr. -Ing Katharina Klemt-Albert
<b>Language</b>	German/English
<b>Assignment to the curriculum</b>	Elective Module
<b>Recommended requirements</b>	Recommended Knowledge: 'Digital Building and Construction', 'Construction Site Management' ('Construction Methods and Economics' and 'Construction Methods I').
<b>Participation requirements (study program specific)</b>	-
<b>Teaching form</b>	Examination, Lecture, Exercise
<b>Examination mode</b>	Graded written exam and graded term paper. The module grade is weighted according to the CP distribution. There are no prerequisites for participation in the written exam and the term paper.
<b>Workload</b>	Total 90 h, Lecture hours 30 h (2 SWS), Self-study 60 h
<b>Lecture hours</b>	2 SWS
<b>ECTS-Credit Points (CP)</b>	5

<b>Learning objectives</b>	<p>The module provides a holistic overview and insight into the most important technologies and trends in the construction industry in the coming years. For each technology, the theoretical basics are taught first. This implies the presentation of the basic theoretical definitions and functional types of the technologies as well as the requirements of the organizational, process and data technology level. Furthermore, the fields of application of the technologies in the construction industry are presented and underlined with practical examples. After successful completion of the course, students will learn the basics and fields of application about the key technologies of the next decade in the construction industry. Students will be able to identify the potential of digitalization and automation from existing actual processes in the construction value chain and derive requirements based on this. At the same time, after successfully passing the module, students have the ability to determine the opportunities and possibilities as well as the challenges in the implementation and use of different disruptive technologies.</p>
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<b>Content</b>	<p>Due to the increasing digitalization of process structures and the establishment of disruptive technologies as well as new digital methods, the transformation of the construction industry is progressing ever faster. In the module, students are given a holistic overview of new innovative technologies in the construction industry. Theoretical fundamentals are taught and underpinned with practical case studies. In addition, one to two practical presentations by innovative companies are scheduled per semester. The following specific content will be taught to students in the Innovative Technologies in Construction module: A. Production and automation B. Industrial Construction C. Robotics in construction (e.g., painting, drywall, slab and tile work) D. Artificial intelligence in construction E. Immersive technologies &amp;; visualization (VR/AR/XR). Guest lectures: 1-2x from innovative company.</p>			
<b>Media</b>	RWTHmoodle			
<b>Literature</b>	<p>Gebhardt, A. (2016). Additive Fertigungsverfahren: Additive Manufacturing und 3D-Drucken für Prototyping - Tooling - Produktion. Springer Verlag. Wiesbaden. Dörner et. al. (2019). Virtual und Augmented Reality (VR/AR): Grundlagen und Methoden der Virtuellen und Augmentierten Realität. Springer Vieweg. Berlin Ertel, W. (2016). Grundkurs Künstliche Intelligenz: Eine praxisorientierte Einführung (Computational Intelligence). Springer Vieweg. Wiesbaden Maier, H. (2019). Grundlagen der Robotik VDE Verlag.</p>			
<b>Lectures / Examinations</b>				
<b>Title</b>	<b>ECTS</b>	<b>Workload</b>		<b>Duration of Exam (min)</b>
		<b>Lecture h. (SWS)</b>	<b>Self-Study (h)</b>	
Written Exam Innovative Technologies in Construction (302123501)	5	0	0	See above
Term paper Innovative Technologies in Construction (302123502)	0	2	30	0

Lecture Innovative Technologies in Construction	0	2	30	0
<b>Teaching Unit / Examinations: Examination Innovative Technologies</b>				
<b>Title</b>	Examination <b>Innovative Technologies</b>			
<b>Sub-title</b>	Exa ITC			
<b>Semester allocation</b>	3			
<b>Connection to the curriculum</b>	Elective Module			
<b>Teaching Unit / Examinations: Lecture Innovative Technologies</b>				
<b>Title</b>	Lecture Innovative Technologies			
<b>Sub-title</b>	L ITC			
<b>Semester allocation</b>	3			
<b>Connection to the curriculum</b>	Elective Module			
<b>Teaching Unit / Examinations: Exercise Innovative Technologies</b>				
<b>Title</b>	Exercise Innovative Technologies			
<b>Sub-title</b>	E ITC			
<b>Semester allocation</b>	3			
<b>Connection to the curriculum</b>	Elective Module			