Course edition	1	Academic Year	2022/2023

Ref.	MBUILD08/ M23
MODULE	ICT FOR CONSTRUCTION PROJECTS AND BIM
ECTS	6
Year/Semester	Y1/S2
Class hours	4 h/week * 13 weeks = 52 h
Teaching location	THM, Giessen, Germany

1. OBJECTIVES

Today construction projects are more complex and sophisticated than in the past. Due to an extreme heterogeneous network in construction projects, deadline pressure, last minute changes and missing communication between all parties involved construction projects running out of time and cost.

With the application of 4D and 5D BIM process, engineers and architects are able to forecast time and costs before construction begins. Furthermore, the usage of parameters for sustainability (6D), as for thermal and acoustic comfort, allows important decision in a construction project in a very early phase. This eases the quality of the project and meet clients' requirements.

- Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context.
- Students are able to apply their acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.
- Students are able to integrate knowledge and deal with the complexity of making judgments based on information that is incomplete or limited, including reflections on the social and ethical responsibilities associated with applying their knowledge and judgments.
- Students are able to communicate their findings and the ultimate knowledge and reasons behind them to specialist and non-specialist audiences in a clear and unambiguous manner.
- Students possess the learning skills to enable them to continue studying in a largely self-directed or autonomous manner.
-

2. LEARNING OUTCOMES AND COMPETENCES

- Fundamental usage of 5D-BIM
- Programming with Dynamo for building problems
- Modeling in 5D
- Information/data exchange

3. SYLLABUS/TOPICS

1. Fundamentals of 3D, 4D and 5D-BIM modelling.
2. Principles of BIM model-based tendering, awarding and accounting; awarding processes and the accounting process using Enterprise Resource Planning (ERP) systems.
3. Principles of ICT-based project preparation: Project scheduling (4D) development, organization of projects, cost management (5D) and sustainable construction (6D).
4. Modeling relations and main influencing factors of 3D-models.
5. Fundamentals in collaborative working using Common Data Environment (CDE).

6. Integration of Internet of Things (IoT) in building and construction.
7. Visual programming for building problems.
8. Decision making generating model design alternatives and engineering solutions.

4. Mandatory References

- Books, ebooks and other sources about: BIM 5D, buildingSMART Documents, programming with Dynamo, Visual Basic, Python or Java

5. Additional References

- Other resources to be provided during the module, in connection with the way the research will be done.

6. Assessment Type

- Distributed only (courseworks and activities developed during the semester)

7. Assessment Components and Calculation of Final Grade

7.1 Normal assessment (two opportunities)

The module will be assessed by:

- Exercises /courseworks, to be developed during the teaching period. Some of them will be in groups, some of them individuals. Details will be defined at the beginning of the classes by each lecturer.

	Nr	Weigh in the final grade	Minimum grade
Block 1: exercises /courseworks	1-10	20%	-
Block 2: exercises /courseworks	1-10	20%	-
Block 3: exercises /courseworks	1-10	20%	-
Block 4: exercises /courseworks	1-10	20%	-
		100%	5.0 (0-10 UC scale) 10.0 (0-20 UP scale) 50.0 (0-100 THM scale)

7.2. Resit assessment

- No minimum grade is required in each specific exercise/coursework or in each block. If the final grade of the module is FAILED, then the student will choose a certain number of exercises/courseworks with the lowest grades of any block to resubmit them in order to increase the final grade of the module to obtain a PASS. In those cases where the original exercise/workshop was submitted in group or in pairs, the new submission will be carried out individually; in those cases, lecturer will adapt the exercise to accommodate the working effort for an individual submission.

- Deadline of the re-submission will be done, as latest, during the official resit period of the semester at THM.

8. Teaching staff

Name	Position	University	email
Dr. Joaquin Diaz	Professor	THM	diaz@bau.thm.de
Dr. Christian Baier	Associated Pofessor	THM	baier@bau.thm.de
Kerstin Lenz	Researcher	THM	Kerstin.lenz@bau.thm.de
João Poças Martins	Associate Professor	FEUP/UP	jppm@fe.up.pt