

# MSc in Construction Information Technology Engineering

## Final Exam questions

### Complex Construction IT project (BMEEODHMB5K)

1. Describe the most important hardware and software components of Internet-of-Things (IoT) devices, and show their application in construction IT!
2. Introduce IoT-based sensor networks, describe the technology and development process!
3. Describe how the energy efficiency of buildings can be measured and what tests would be carried out to assess the condition of building constructions?
4. How can energy consumption, sustainability and comfort characteristics of buildings be modelled? What information is needed for simulations and what workflows are known?
5. Describe the possible applications of BIM in the construction industry. Demonstrate possible applications and technologies of BIM in the design, construction and facility management workflows.
6. Demonstrate the use and potential of extended reality in construction processes

### Construction Information Technology Programming (BMEVIAUM051)

1. Enumerate various data visualization techniques that can be implemented using Matplotlib. Provide a detailed description of each technique and specify appropriate use cases where they may be effectively employed.
2. Elucidate the mechanism underlying K-means clustering. Distinguish between its applications in one-dimensional and multi-dimensional spaces, and provide example use cases for each scenario.
3. Identify the types of operations that can be performed on data using the Pandas library. Discuss how these operations facilitate exploratory data analysis and outline strategies for handling missing data. Illustrate your explanations with examples.
4. Discuss the advantages of utilizing NumPy for data engineering tasks. Identify key functions and methods that contribute to its efficacy in handling data engineering operations. Enumerate practical use cases where NumPy can be beneficially applied.

### Civil Engineering Automation, Modelling (BMEEOHSMB51)

1. Define and draw the flowchart of automation steps of *3D constructional modeling of structural details* throughout the example of Tekla custom components. Explain the input parameters, the possibilities, and the advantages of automation.
2. Define and draw the flowchart of automation steps of *finite element model processes* throughout the example of Axis and Python. Explain the input parameters, the possibilities, and the advantages of automation.
3. Define and draw the flowchart of automation steps of *3D constructional modeling of reinforced concrete structures* throughout the example of Revit and Dynamo. Explain the input parameters, the possibilities, and the advantages of automation.
4. Define and draw the flowchart of automation steps of *defining geometry by parametric design* throughout the example of Grasshopper. Explain the input parameters, the possibilities, and the advantages of automation.