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November 8, 2021

## LETTER OF RECOMMENDATION

We confirm that Grupa4BIM Sp. z o. o. (formerly Grupa4BIM Krzysztof Knapik) provided us with training in BIM methodology.

Wojciech Jędrasz conducted training courses for students of the Faculty of Engineering, majoring in Construction (61 people) on the subject of "Specialized engineering tools in construction" on the dates:

- 28/02/2021 (6 training hours)
- 13-14/03/2021 (9 training hours)
- 27-28/04/2021 (9 training hours)
- 17-18/05/2021 (9 training hours)
- 09/05/2021 (6 training hours)
- 22-23/05/2021 (9 training hours)
- 5-6/06/2021 (9 training hours)
- 20/06/2021 (6 training hours)

Framework program of workshop activities:

1. Definition and basic concepts
2. Not only the drawings, the data included in the model
3. BIM design 3d, 4d (time) and 5d (cost estimation)
4. 6d concept (sustainable design)
5. Concept 7d (interaction with an object, as built model, integration with other systems)
6. Levels of detail (LOD, LOI)
7. BIM levels (Level 0, 1, 2, 3)
8. Roles of participants in the BIM process
9. IFC standard, buildingsmart
10. COBie Standard
11. What gives the use of BIM at various stages of a building's life, including:
  - a. Time benefits
  - b. Benefits related to the reduction of the budget: precision of cost estimation, prevention of changes, prediction of potential errors
  - c. multi-discipline communication and coordination
  - d. ROI Long-term return on investment in BIM: Facilities Management (FM), Asset Management (AM, AIM Server), CAFM, IWMS, iBIM (integrated BIM)
  - e. Building LifeCycle Cost Analysis (Lifecycle Point of View)
  - f. Automated data verification - Cross-platform model
  - g. Comparing CAD design with BIM
  - h. BIM problems (including disadvantages of one central model)
12. The use of BIM technology in the construction investment process

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13. general stages of the construction process:
- a. Tender
    - i. Definition of BIM project roles (contract dependent)
    - ii. Model for tenders
    - iii. BIM and deliverables requirements
    - iv. Document Management System (DMS)
    - v. Specifications of BIM objects: PDT
  - b. Design
    - i. Collaboration / Coordination in BIM (and Related Obstacles)
    - ii. Detailed analysis: construction, error and collision detection
    - iii. Parametric design + programming
  - c. Execution with BIM
    - i. Construction documentation vs BIM
    - ii. Model at the construction site
    - iii. Receipts based on BIM
  - d. Building management with BIM (FM, BMS, IWMS, CAMS)
  - e. Inventory/site survey
    - i. Statement
    - ii. Laser scanning / photogrammetry / drone application
  - f. Renovation / demolition / expansion based on BIM
  - g. Standards / legal norms describing BIM: ISO, UK PAS 11922,3,4,5, NBS DPoW, CIC BIM  
Protocol BIM vs regulations in force in Poland, mainly in the context of PPL.
14. Legal complications: copyright, official documentation, software.

During the provision of services, Wojciech Jędrośz and Grupa4BIM Sp. z o.o. has proved to be a competent and committed partner providing high-quality training services. We are pleased to recommend Grupa4BIM Sp. z o.o. as a competent and trustworthy business partner.

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