COURSE SYLLABUS

Knowledge Intensive BIM, 6 credits

Knowledge Intensive BIM, 6 högskolepoäng

Course Code:	TKBS28	**Education Cycle:**	Second-cycle level
Confirmed by:	Dean Apr 6, 2018	**Disciplinary domain:**	Technology
Revised by:	Director of Education May 22, 2019	**Subject group:**	BY1
Valid From:	Aug 1, 2019	**Specialised in:**	A1F
Version:	2	**Main field of study:**	Product Development

Intended Learning Outcomes (ILO)

After a successful course, the student shall

Knowledge and understanding
- demonstrate comprehension of how research methods can be used to create knowledge about the development and application of digital technologies in the built environment sector

Skills and abilities
- demonstrate the ability to analyze and explain the knowledge domains needed to explore and exploite new, or potentially new digital applications aimed for use in the built environment sector
- demonstrate the ability to analyze and explain how knowledge gained from used research methods can be exploited in the built environment sector
- demonstrate the ability to analyze and explain advantages and disadvantages with different research methods for developing knowledge

Judgement and approach
- demonstrate the ability to analyze and explain pros and cons of various research methods when creating knowledge about the development and application of digital technologies in the built environment.

Contents

The course takes its point of departure in the need for knowledge creation in order to meet emergent digital applications aimed for use in the built environment sector. Knowledge intensive BIM is a continuation of the course Research Method, where the student gains basic knowledge concerning research methods. In this course the focus will be on how research methods can be used to create knowledge about the development and application of digital technologies in the built environment sector.

Thus, in order to gain an enhanced understanding of implementation of digital technologies and the Construction Industry the course includes the following topics:

- Knowledge domains and their taken for granted assumptions
- How to approach and explore knowledge domains
- How to exloit knowledge explored by various research methods

Type of instruction

Lectures, exercises and assignments/project work.

The teaching is conducted in English.

Prerequisites

Passed courses 180 credits in first cycle, at least 90 credits within construction engineering or civil engineering and 15 credits Mathematics, and completed the course BIM - Management and Control, 4,5 credits and the course Research Methods, 6 credits

Examination and grades

The course is graded 5,4,3 or Fail.

Registration of examination:

Name of the Test	Value	Grading
Examination[I]	3 credits	5/4/3/U
Assignments/Project work	3 credits	U/G

[I] Determines the final grade of the course, which is issued only when all course units have been passed.

Course literature

The literature list for the course will be provided one month before the course starts.

Research Methods

Dermot Kehily and Jason Underwood (2015). Design Science: Choosing an appropriate methodology for research in BIM, CITA BIM Gathering 2015, November 12th -13th 2015.

BIM

Sepehr Alizadeh Salehi, Ibrahim Yitmen (2018), Modeling and analysis of the impact of BIM-based field data capturing technologies on automated construction progress monitoring, International Journal of Civil Engineering, https:*doi.org/10.1007/s40999-018-0320-1*

*Sepehr Alizadehsalehi, Ibrahim Yitmen, Tolga Celik & David Arditi (2018): The effectiveness of an integrated BIM/UAV model in managing safety on construction sites, International Journal of Occupational Safety and Ergonomics, https:*DOI:10.1080/10803548.2018.1504487

Adán, A., Quintana, B., Prieto, S. A. & Bosché, F. N. Scan-to-BIM for 'secondary' building components, Aug 2018 In: Advanced Engineering Informatics, 37, p. 119–138.

Bueno, M., Bosché, F., Gonzalez-Jorge, H., Martinez-Sanchez, J. & Arias, P. 4-Plane Congruent Sets for Automatic Registration of As-is 3D Point Clouds with 3D BIM models May 2018 In : Automation in Construction. 89, p. 120-134 15 p.

Boton, C. (2018) Supporting constructability analysis meetings with Immersive Virtual Reality-based collaborative BIM 4D simulation, Automation in Construction, 96, pp.1–15.

Papadonikolaki, E. (2018) Loosely coupled systems of innovation: Aligning BIM adoption with implementation in Dutch construction, Journal of Management in Engineering, 34 (6), 05018009.

Malak Al Hattab, Farook Hamzeh (2018). Simulating the dynamics of social agents and information flows in BIM-based design, Automation in Construction, 92, pp.1–22.

Eleni Papadonikolaki, Alexander Verbraeck & Hans Wamelink (2017) Formal and informal relations within BIM-enabled supply chain partnerships, Construction Management and Economics, 35:8-9, 531-552, DOI: 10.1080/01446193.2017.1311020.

Gulbin Ozcan Deniz, (2017) "An analytic network process (ANP) model to examine LEED-certified
buildings' operational performance", Built Environment Project and Asset Management, Vol. 7 Issue:
4, pp.366-376, https://doi.org/10.1108/BEPAM-11-2016-0073.

Kovacic, I, Reisinger, J., Honic, M. (2018) Life Cycle Assessment of embodied and operational energy for a passive housing block in Austria, Renewable and Sustainable Energy Reviews, 82, 1774–1786.

Röck M, Hollberg A, Habert G, Passer A, (2018). LCA and BIM: Visualization of environmental potentials in building construction at early design stages, Building and Environment doi: 10.1016/j.buildenv.2018.05.006.

Mohamed Marzouk, Shimaa Azab, Mahmoud Metawie (2018), BIM-based Approach for Optimizing Life Cycle Costs of Sustainable Buildings, Journal of Cleaner Production doi: 10.1016/j.jclepro.2018.03.280

Lavinia Chiara Tagliabuea, Giuseppe Martino Di Giudab, Valentina Villac,Enrico De Angelisb, Angelo Luigi Camillo Ciribinid (2018). Techno-economical Analysis based on a Parametric Computational Evaluation for decision process on envelope technologies and configurations, Energy and Buildings 158 736–749.

Worawan Natephra, Nobuyoshi Yabuki, Tomohiro Fukuda (2018). Parametric modeling–based BIM for evaluating thermal performance of building envelope with real-time energy feedback visualization 17th International Conference on Computing in Civil and Building Engineering 2018, 22nd - 24th June.

Xiao Lia, Peng Wub, Geoffrey Qiping Shena, Xiangyu Wangc, Yue Tengd, 2017. Mapping the knowledge domains of Building Information Modeling (BIM): A bibliometric approach, Automation in Construction, 84, 195–206.

Built Environment 2050, A Report on Our Digital Future, Construction Industry Council, 2014.

Ingibjörg Birna Kjartansdóttir, Stefan Mordue, Pawel Nowak, David Philp, Jónas Thór Snæbjörnsson, Building Information Modelling BIM, Iceland, Great Britain, 2017.