



Faculty of Health, Science and Technology
Construction Engineering

Syllabus

Computer Aided Construction Design in a BIM Process

Course Code:	BYGB22
Course Title:	Computer Aided Construction Design in a BIM Process <i>Byggprojektering med datorstöd i BIM-process</i>
Credits:	20
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:
BYA (Building Technology)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2015-02-05, and is valid from the Autumn semester 2015 at Karlstad University.

Prerequisites

The courses Engineering 15 ECTS cr and Energy and Environmental Engineering 15 ECTS completed, and the courses Building Technology, Building and Urban Planning Engineering Design: Timber Structure, and Construction Management I attended, or TGHBY enrollment, or equivalent.

Learning Outcomes

The aim of the course is that students acquire basic knowledge of and skills in computer aided construction design for all the stages of a BIM process.

Upon completion of the course, students should be able to:

- give an account of the design and application principles of a BIM-based work process and its information flow,
- give an account of and apply industry standard documentation,
- demonstrate ability to produce a selection of relevant documents for the different stages of the planning and design process with the aid of computer software and consistent with industry standard,
- demonstrate ability to implement, plan and evaluate a computer aided design process,
- demonstrate ability to problematise and see the potentials and risks of a BIM based process,
- continuously evaluate their results from a process perspective,
- demonstrate the ability to use relevant computer software in different stages of the design process and transfer information between different computer programs,
- demonstrate the ability to plan and design a small residential area in compliance with current norms pertaining to basic principles of sustainable development,
- demonstrate ability to plan and design a house in accordance with current building codes and human needs and consideration of architectural quality,
- design a climate shell for a building that meets the building code requirements on energy efficiency

and moisture safety,

- use computer based aides to establish energy balance for small houses with given data, and interpret and present the results,
- structure and give an account of accumulated load and dimensioning according to the building code for small timber buildings including drawings according to industry standards,
- demonstrate knowledge and skills in using computer based aids for calculating accumulated load and dimensioning, and discuss and assess validity,
- use computer based aids for making a cost estimate for a small building,
- draw up a simple quality, environment and work environment plan in the design stage,
- present their work with computer visualisations,
- give constructive criticism on other people's work.

Content

The course comprises theoretical as well as practical components. The main part of the course consists of a construction project plan comprising:

- area planning
- construction planning
- building planning including heat and humidity calculation
- construction estimates for a small two-storey timber house
- cost estimate

The focus is on students' ability to carry out a major project process. The use of computer-based aids involves:

- BIM as a work process
- information flows in the planning process
- handling drawings in the construction and design process
- construction planning in CAD
- drawing content, drawing structure and supplementary descriptions
- dimensioning
- model and reference file management
- production of three-dimensional models and illustrations
- calculating accumulated load with the computer aid, Robot
- calculating energy balance in VIP energy
- calculating cost in BidCon
- import and export of files and information

The project is mandatory and individually performed.

Instruction is in the form of lectures, computer exercises, seminars, supervision and possible field studies.

Reading List

See separate document.

Examination

Assessment is continuous and based on documentations on the project, which also includes a self-evaluation of the students' own work process. Students are also required to comment on each others' projects. Assessment is also based on mandatory seminars, written exams and oral and written presentations.

Grades

One of the grades Fail, 3 (Pass), 4 (Pass with some distinction, or 5 (Pass with Distinction) is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon

completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

The courses BYGA11, BYGA12, BYGA13 and BYGB17 cannot be included in the same degree programme.

The local regulations for studies at the Bachelor's and Master's levels at Karlstad University stipulate the obligations and rights of students and staff.