Proposal for a BSc thesis at the Department of Architecture and Civil Engineering

**Title / Title**

Building performance measurement of indoor environmental quality - A field study in Chalmers campus building

**Beskrivning / Description**

bakhgrund och problembeskrivning, ca 150 - 500 ord / background and problem description, app. 150-500 words

Human can spend, on average, 85-90% of total life time indoors for studying, working and living. No doubt the key function of a building needs to create livable and sustainable indoor environments. Thus, it is of great significance to be aware if the environment we are living in is comfortable and healthy.

Indoor environmental quality (IEQ) mainly includes the four aspects from thermal environment, air, acoustic and lighting. IEQ can influence occupant's comfort. For example, too cold and warm, dry air, odours, noisy space, and dim or glare lighting. Moreover, a follow-up of healthy problems happens, for instance, headache, cough, and eye irritation. Then how we know if the IEQ is qualified or non-qualified? Field measurement is a practical skill to examine and evaluate the building performance of IEQ, such as air temperature, relative humidity, carbon dioxide concentration, acoustic level and illuminance. In the Swedish building code, it gives the required level and range of physical parameters to guarantee the indoor conditions.

Therefore, the candidates need to conduct the physical measurements in a case study building concerning the aspects of thermal, air quality, lighting and acoustic. The key parameters will be monitored during the winter/spring time by advanced equipment and sensors. The candidate should also collect relevant information about indoor environmental requirements from national building code and guidelines. The case study building is an office and educational building located in Chalmers campus which has been approved by Swedish building certification schema Miljöbyggnad as a high-performance building. The building was newly renovated during 2016/2017. Thus the thesis work will be very meaningful to timely examine the building’s real performance after the construction. There is also a chance to present the results to the project partners of Chalmers CF, Bengt Dahlgren or Akademiska Hus. Depending on the interest, we will make the measurement plan and separate the role in the group.

This thesis topic is a good opportunity for the students to comprehensively understand the different aspects in indoor built environment. On the one hand, it will help the students who have interests to go further on the research of any of the above themes. On the other hand, the practical skills to measure a series of physical parameters related to occupant comfort and health are more appreciated by industries. At the end of building construction and development phase, indoor measurements are required to qualify the building to use.

**Målgrupp av studenter / Target group of students**

ex Samhällsbyggnadsteknik, Maskinteknik, Kemiteknik med fysik… flera program hittar du här e.g. Civil Engineering, Mechanical Engineering, Chemical Eng. with Eng. Physics, … more programs here

Samhällsbyggnadsteknik, civilingenjör
Arkitektur och teknik

**Gruppstorlek / Group size**

minimum 3 studenter/students, maximum 6 studenter / students

3 - 4 students

**Litteraturförslag / Litterature proposal**


Speciella förkunskapskrav / Special prerequisites  

| Courses on building technology, building physics, building installations, indoor climate, etc. |

**Handledare / Supervisor**

Quan Jin

**Examinator / Examiner**

Ej samma person som handledare / Cannot be the same person as supervisor

Holger Wallbaum

**Kan projektet dubbleras? / Can the project be doubled? JA / NEJ**  
dvs. kan det vara flera grupper som jobbar med samma tema / e.g. can several groups work on the same subject

No

**Studenter med förtur till projektet / Students with priority to the project**  
Gäller endast om studenter har föreslagit projektet / Applies only if the project has been suggested by the students

No
Bilaga / Appendix

Utdrag från Förslag på krav för kandidatexamen inom Samhällsbyggnadsteknik, civilingenjör 300 hp.

Example on how to define prerequisites

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<th>Kandidatarbete inom</th>
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<tr>
<td>Installationsteknik</td>
<td>Byggnadsfysik och byggnadsakustik, civ.ing. Installationsteknik, civ.ing.</td>
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<tr>
<td>Konstruktionsteknik</td>
<td>Strukturmekanik och Konstruktionsteknik</td>
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<td>Byggnadsteknologi</td>
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<tr>
<td>Teknisk akustik</td>
<td>Byggnadsfysik och byggnadsakustik, civ.ing. Infrastruktur, civilingenjör</td>
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<td>Hydrogeologi och geoteknik, civilingenjör Infrastruktur, civilingenjör</td>
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<td>Trafik/Mobilitet</td>
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<td>Projekt- och produktionsledning</td>
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