



Complex Design I Task Description MSc Academic Course

1. Design Task Outline

1.1. Preparatory study

- **Demands:** Analyze the building program based on its use and comfort requirements of the occupants: maximum number of occupied areas, the desired indoor temperature and humidity, air quality requirements, operating times, schedules, etc. The above information consists of recording the values from the analysis of mentioned fields, and the other part covers the analysis of building operating "rhythm", or if the program of the building has different parts from the rest.
- **Facilities:** Location of the planning endowments, restrictions and opportunity analysis. Analyze the following aspects: the areas orientation, shaded buildings (adjacent buildings, vegetation), slope conditions and geological conditions, risk of flooding, available utility connections.
- **Renewable energy:** 25% of total energy use of the building must come from renewable energy sources. Make a preliminary analysis of applied technologies: make a list of the technologies available today, then knowing the location and design programs analyze in 1-2 sentences the basis of its application. The above technologies are listed in three types: simple to apply, difficulties can occur, and not applicable. Based on the analysis choose at least one or up to three technologies. Describe the requirements of the selected application technology, which are mandatory to be taken into account during the architectural design!

1.2. Drawing task

- Identify the building utilities and determine the energy potential, preparation of utility layout of the property on at least 1:500 scale. On a conceptual design plan level designate the building's mechanical and electrical spaces.
- Contain a draft plan of the energy operations of the building on a power supply concept level. The conceptual plan should be prepared for typical operation intervals (see 1.1 task demands)!

In order to obtain a signature, the implementation of the above points into the draft plan is mandatory! The deadline for signing draft plans is the same as the acquisition of the design and planning departments outline plan deadline. If the draft plans are not signed before deadline, it may result in the denial of the semester's acceptance.



2. Agenda

Preparation of the following work plan's parts based on the adopted draft plan:

2.1. *Building physics, building energy calculations*

- Boundary surfaces (wall, floor, roof etc.) heat and humidity transfer calculations. Representation is required on the partial pressure and temperature diagram.
- Proof that the boundary surfaces correspond to 7/2006. TNM requirements of "nearly zero energy buildings".
- The building energy control and energy certification according to the existing 7/2006. TNM regulation. The planned building must satisfy the requirement levels for a nearly-zero energy building! The calculation should be prepared manually based on the above referenced regulations. Computer processing is allowed for those students who have signature from one of the following subjects "Solar buildings computer design" or "Energy-conscious design methods". In the calculation the proposed building envelope and window structure should be specified with factors of heat transfer, the specific heat loss factor with simplified calculation method as well as the overall energy performance, which is carried out under the building energy classification.

2.2. *Drawing task*

- Plumbing and electrical facilities designation on the architectural plans, indicate in the plans (substation or boiler house, gas measurement space, ventilation machine room, air conditioning (cooling towers), positioning, electrical switches, transformer stations, mechanical shafts of the main equipment, ductwork, etc.), and an indication of the elements influencing the facade (chimneys, air outlet and inlet means, cooling equipment outdoor units, air handling units disposed outdoors, etc.).
- Facilities or spaces within the building have to ensure an unobstructed approach for handicapped, disabled visitors and employees.

2.3. *Building services and electrical equipment technical description*

- Description of the planned building services, plumbing, lighting and electrical equipment approximated sizing, conceptual description of the key design and performance data.
- Determination of energy utilities and power demands.
- Description of the plumbing and electrical aspects of fire protection (fire water network, built-extinguishing systems, fire water tanks, smoke-free stairwell, heat and smoke ventilation, fire alarm system, inhibiting the spread of fire systems and their controls, etc.).
- Environmental aspects: steps taken to chimneys air protection, waste management and emission reduction.

The final signature of the acquisition is conditional on implementation of this program points!