الكلية العالمية للهندسة والتكنولوجيا

GLOBAL COLLEGE OF ENGINEERING AND TECHNOLOGY

Design Project

Lecture 1

Topics Covered

- Building CAD and BIM files.
- Analysis of microclimate, building fabric…
- Describe the fundamentals of the building
- Details the roles and responsibilities for the project team,
- Details the Project Team Structure with project organization chart

Building CAD/ BIM Files from Given Layout

Step 1: **Introduction to CAD/BIM Software**

- CAD software is a tool used by engineers, architects, and designers to create **precise 2D or 3D drawings** of buildings, products or systems.
- To design and modify layouts digitally, which is far more efficient than traditional paper-based methods.
- Accuracy, efficiency, collaboration, visualize.
- BIM is an advanced process that goes beyond CAD by incorporating **intelligent 3D models** that contain not just geometric data, but also information about the building's materials, systems and lifecycle.
- BIM includes information about **building materials, costs, construction schedules**, and even **maintenance** after the building is constructed.

Building CAD/ BIM Files from Given Layout

Step 2: **Converting Layout into Digital Format**

The provided building layout and convert it into a digital format using the appropriate CAD/BIM tool.

Ensure that all structural and spatial elements (walls, doors, windows, etc.) are accurately represented.

Building CAD/ BIM Files from Given Layout

Step 3: **Defining Building Elements**

Include building elements like the **building frame**, **structural materials** (e.g., concrete, steel) and room types (office, exhibition space, etc.). Attention to detail and scale.

Building CAD/ BIM Files from Given Layout

Step 4: **Integration into Environmental Design**

The CAD/BIM file will be used in later steps to analyze microclimates, building fabric and dynamic analysis to improve environmental performance.

Analysis of Microclimate, Building Fabric

The climate in the immediate vicinity of a building.

Explain how factors like surrounding buildings, vegetation, and water bodies affect temperature, humidity, and wind patterns.

Building fabric materials (walls, roofs, windows) and how these affect heat retention, solar gain, and overall energy performance.

For example, materials with high thermal mass (e.g., concrete) can store and release heat, affecting indoor temperature.

Case study building

First up you will need to submit a case study building on which you will complete the MEP design.

Submit the ‘case study proposal form’ alongside drawings of the building in blackboard assessments (or coursework) tab.

You **CAN NOT** be working on this project at work in any context

Min number of floors (levels)	**1**
Min size	1000m²
Building use	Must have a specialist environment e.g.– Laboratory, Data centre, Medical environment - hospitals, arenas/stadiums, airports, multi-use education building with labs etc These areas can be artificially added or created to existing architectural layouts.
Floor plans	Must have DWG or PDFs of floor plan for each floor of your building

Fundamentals of the building

Building Frame Type

Concrete frame: Heavier, strong in compression, has high thermal mass.

- Steel frame: Lighter, more flexible, faster construction, but lower thermal mass.

Number of Floors

Students should note how the number of floors influences the building's energy performance, ventilation, and lighting needs.

For example, taller buildings might have different heat distribution and daylighting requirements compared to low-rise buildings.

Types of Spaces

Describe the different functions of the spaces within the building, such as:

- Offices: Higher ventilation, lighting, and comfort control needs.
- Exhibition Spaces: Consideration of flexible lighting and temperature control for
- Educational Spaces: Focus on air quality, lighting uniformity, and acoustic perfor

Roles and Responsibilities for the Project Team

In any building design or construction project, the project team is composed of different professionals, each responsible for specific tasks, how they contribute to the successful completion of the project.

Example : Project Manager, Architect

Case study building

If you don’t have a building to use, please contact me and we will provide you a building.

Thankyou!