

**Birzeit University**  
**Faculty of Engineering**  
**Department of Civil and Environmental Engineering**

**ENCE 335, Reinforced Concrete Design I**

**Homework assignment #6**  
**The BIG ONE**

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**Written PART**

**Phase 1: (100 Points)**

**Due Wednesday Dec. 23<sup>st</sup> 2020**

Given the following floor layout.

- Decide the appropriate location of columns.
- Distribute the beams and ribs in a way you can use ACI code coefficients for analysis.
- Calculate the minimum required thickness of the slab and beams.

You should keep in mind the following restrictions.

- Columns should be hidden within the walls
- You can put columns on all corners of the building
- Only hidden beams are allowed.
- Calculate the minimum slab and beam thicknesses.
- Use standard unit weights and thicknesses for the super imposed dead loads
- Include a 1.5 kN/m<sup>2</sup> added to the dead load to account for partitions

**Phase 2: Beam design (200 Points)**

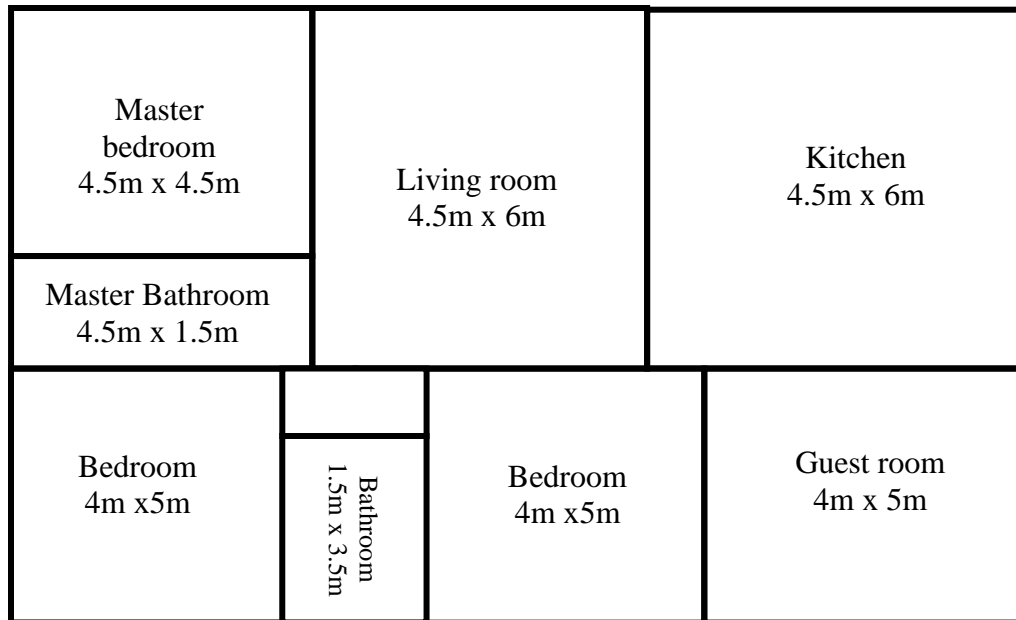
**Due Monday Jan 4<sup>th</sup> 2020**

- Calculate the total dead and live loads
- Calculate the ultimate uniform load on the slab
- Draw shear and moment diagrams using ACI coefficients.
- Analyze the beams using FE software (SAP2000, ETABS, .... etc.) and compare the results with ACI coefficients. **(BONUS +25 Points)**
- Design the All beams for shear and moment.
- Prepare proper detailing for the beams, side views and cross sections.
- Draw All beam detailing using AutoCAD. **(BONUS +10)**
- Show your calculations

**Phase 3: (200 Points)**

**Due Monday Jan 18<sup>th</sup> 2020**

- Draw shear and moment diagrams using ACI coefficients.
- Analyze the beams using FE software (SAP2000, ETABS, .... etc.) and compare the results with ACI coefficients. **(BONUS +25 Points)**
- Design the ribbed slab for shear and moment.
- Prepare proper detailing for the slab, plan view and cross sections.
- Draw Slab detailing using AutoCAD. **(BONUS +10)**
- Show your calculations



**Oral Part:**

- Each group must prepare a recorded presentation for their project and upload it to google drive
- All group member must participate in the recorded video
- An oral exam will be held on Jan-20<sup>th</sup> (last lecture) where each group is asked questions (each member will get at least 2 questions)
- Each group will be admitted and examined separately.
- Questions are limited to the part you presented in the video. Each student must be familiar with each step of the project
- Be prepared and have backup plans in case something goes wrong

**Grades for the written part are included in the HWs**

**Grades for the Oral part will have a separate value from the final grade**