Middle East Technical University
Civil Engineering Department
CE 486 Structural Design - Concrete Structures **Deadline: 12.25.2014**

CE486 TERM PROJECT

Final Design (Due Date: December 25th, 2014)

Architectural drawings (plan and elevation) of a social facility building are uploaded the course's web page and odtuclass system. Assume that the building is located in İstanbul at seismic zone 2 and rests on Z2 class soil.

While designing the building, follow the guidelines of TS498, TS500 and the Turkish Earthquake Code 2007.

1. Form a group of three students and send the list of names to Vesile Hatun Akansel. Work on the following tasks as a group and state who is responsible from each task and who checked the computations for that task
   - Study the architectural plans
   - Establish the structural design criteria
   - Determine the loads and load combinations (gravity loads only)
   - Establish a load carrying mechanism and perform a preliminary design
   - Select load combinations.
2. Assume the allowable bearing pressure is 2.0 kg/cm^2.
3. Construct a computer model .
4. Check your preliminary sizing of members with internal forces obtained from analysis under gravity load combination.
5. Design the slab and provide reinforcement detailing on a scaled engineering drawing.
6. Determine the ductility level for each orthogonal direction for seismic analysis.
7. Determine the natural period of the structure in two orthogonal directions.
8. Conduct series of earthquake analyses and determine the forces in the critical beam, column, beam-to-column connection and the shear wall.

9. Check irregularities and compute story drifts.
10. If needed, resize your members.
11. Determine the critical foundation moment.
12. Design the critical beam, column, beam-column connection and shear wall. Provide reinforcement detailing on a scaled engineering drawing for these members.
13. Submit an engineering report for your computations. Engineering calculations should involve all required calculations that were performed during the design, the explanation of the structural models utilized in the analysis, all modeling assumptions and important analysis outputs utilized during the design.
14. Submit design drawings with your report.
15. Determine the size of expansion joint between two building blocks.

Important Notes

- **All submitted drawings should be scaled engineering drawings. Hand sketches are not accepted. You are not allowed to use any software that automatically prepares structural drawings or reinforcement detailing.**
- **You must prepare your report in such a way that any engineer can follow and understand your calculations.**
- **YOU MUST SUBMIT YOUR OWN WORK. EVERYTHING THAT WILL BE SUBMITTED IN YOUR REPORT MUST BE PREPARED BY YOUR GROUP (Even your drawing frames).**