CLASSWORK - STUDIO SESSION #3

For the second floor of the building design one-way slab supported by the beams along lines A, B, C, D (Note that this is the similar requirement as in Homework #3 which requires a ribbed slab).

Required

1. For the floor layout of Homework #3, determine the location of columns, beams and slabs strips - show it on the sketch of the floor.

2. Determine the static scheme of slabs – show dimensions

3. Estimate the thickness of the slab and determine the dead loads on one of your beams.

4. Estimate the dead and live loads on one typical strip of slab.

5. Estimate the moment envelope according to the ACI code or approximate formulas from the code.

6. Calculate the reinforcement required.

7. Determine the rebars and their length according to the envelope. (use graphics and tables for the development length.

8. Submit work done with sketches and calculations at end of the session.
HOMEWORK 2

Design the beams on third floor assuming that the slab is supported in one direction on beams along axes 1, 2, 3, and 4.

Required

1. Determine the slab thickness by approximation and determine the dead load.

2. Determine the load on the beams by “tributary area” method.

3. Determine the design moments and shear in critical sections according to the approximate ACI requirements (and comments) for all beams – use ACI tables.

4. Determine the moment and shear envelopes of one beam only (i.e., along axis 2 using the computer (STRAND, STAAD, or equivalent)).

5. Adjust negative and positive moments determined in Step #4 by “redistribution” (where it applies). Compare results here with those in Step #3. [Do not redistribute moments from Step #3]

6. Determine the dimensions of the beams’ cross sections and the reinforcement for bending and shear. Consider all beams to have T sections or inverted L.

7. Determine graphically or analytically the length of the reinforcement for proper (bond) development and lab splices where applies (show on diagrams) based on cover of moment envelope.

8. Show the reinforcement on a sketch with all the required details – bars and cross sections.

9. Show in a table all necessary materials, i.e., concrete volume and reinforcement.