HOMEWORK 3

Design the slab at the second floor as a one-way ribbed slab supported by the beams along axes A, B, C, and D.

Required

1. Determine the slabs’ moment envelope using rigorous elastic analysis (i.e., by STAAD, or equivalent).

2. Redistribute moments to determine the final envelopes.

3. Design the reinforcement required in the ribs (joists) for moment resistance.

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

5. Verify the shear resistance near the interior supports. If necessary design the shear reinforcement using 45° bended bars, or by widening the longitudinal ribs.

6. Verify the instantaneous deflections in the end span of each beam using the weighted average of the moment of inertia.

7. Sketch on drawing paper the plan of the floor and the reinforcement as required for construction. Specify the length and the number of all bars (including stirrups).

8. Prepare a list of materials: Show in a table all necessary materials, i.e., concrete volume and reinforcement sizes, length and number. Determine the total weight of (i) concrete and (ii) steel

Note: *If the material presented in class did not cover a subject, do not complete the requirement* for the initial submittal, but complete it for the submittal with the next homework!