Take-Home Exam Agreement

The intent of a take-home exam is to evaluate and assess what you individually understand. Any attempt to pass of another's work as your own on this take-home exam is considered to be cheating, plagiarism, and fraud; and is a violation of NAU's Policy on Academic Dishonesty. At a minimum, violation of the Policy on Academic Dishonesty will result in a failing grade in this course.

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Permitted Sources

- ACI 318-19
- All class materials in BBLearn (notes, HW solutions, etc.)
- All Reinforced Concrete textbooks.
- YouTube videos, online tutorials for reinforced concrete design

Prohibited Sources

- *Chegg* or similar repository where someone else works out the solution specific to this exam.
- Other classmates' solutions.

Per your signature below, you attest that the work submitted for this take-home exam is completely your own and you understand the instructions listed above.

_____

Print your Name **Signature** **Date**

DUE WEDNESDAY DECEMBER 11 BY 7:30 AM (upload into BBLearn)

READ CAREFULLY!

Analyze the following concrete frame. The beam and two columns are used to support a masonry wall and roof live load.

MATERIAL PROPERTIES: f'_c and f_y
MASONRY WEIGHT: **80 lb./ft^2** of surface area.
BEAM WEIGHT: you must calculate.

For your analysis, show all work and answer the following questions:

1) Is the service stress in steel reinforcement due to roof live load **≤ *0.5f_y***?
2) Is the sustained load deflection of beam at 4-months due to its self-weight (assume simply supported) **≤ *L/180***?
3) Masonry is installed when beam is 4-months old. Is the sustained load deflection the masonry "feels" from 4-months until 5+ years **≤ 3/8 inch**?
4) Does the hooked development length of the beam bottom reinforcement fit in column? NO EXCESS REINFORCEMENT FACTOR ALLOWED!
5) What is the maximum flexure (Mu) that can be applied to the column given the axial load (Pu) that it must resist? → *"SIMPLE" INTERACTION DIAGRAM* OK!*

* Note: "simple" interaction diagram constructed from three data points (pure compression, balanced condition, and pure tension)

Concrete Frame Supporting Masonry Wall and Roof Live Load