

FACULTY ART DESIGN AND ARCHITECTURE

2014 November

Main Assessment

DEPARTMENT OF ARCHITECTURE

MODULE NAME	:	Construction & Detailing 3
MODULE CODE	:	ATC 311
DATE	:	7 November, 2014
DURATION	:	180 minutes
TIME	:	8:30
TOTAL MARKS	:	200
ASSESSOR(S)	:	Jason Frenkel
MODERATOR(S)	:	Dirk Bahmann
NUMBER OF PAG	<u>ES</u> :	8

INSTRUCTIONS TO CANDIDATES:

- Question papers must be handed in.
- This is a <u>closed</u> book assessment.
- Read the questions carefully and answer only what is asked.
- Number your answers clearly.
- Write neatly and legibly.
- Structure your answers by using appropriate headings and sub-headings.
- The general University of Johannesburg policies, procedures and rules pertaining to written assessments apply to this assessment.

QUESTION ONE

Choose a specific building material and trace its production/manufacture/fabrication, from the formation of the raw material(s) to delivery to site IN UNDER 1 PAGE. Your material selection needs to be specific (i.e. 'wood' or 'steel' are not valid selections, but '114x38 Grade A SA Pine' or '50x50x3 mild steel square hollow sections' are. NOTE THAT I WILL STOP READING YOUR ANSWER AT THE END OF THE 1ST PAGE. (30)

QUESTION TWO

At what stage in the design process should an architect start thinking about construction? (5)

QUESTION THREE

When does the design process end? (5)

QUESTION FOUR

Explain the following quote by Friedrich Nietzche "When one has finished building one's house, one suddenly realizes that in the process, one has learned something that one really needed to know in the worst way – before one began." (5)

QUESTION FIVE

Define the following terms and provide an example of each:

- a. Embodied energy (3)
- b. Temporal contingency(3)
- c. Critical path(3)
- d. Tectonic expression(3)
- e. Holographic approach to detailing (3)

QUESTION SIX

For your full-scale detail project, you needed to compile 3 documents in addition to the construction drawings. What were those documents? What information should be contained in each document? How do the documents relate to each other? In the professional world, who is responsible for compiling each of the documents? (21)

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QUESTION SEVEN



FIRE-RESISTANCE RATINGS FOR STEEL BEAMS AND GIRDERS

Exposed steel beams and girders may be used in Unprotected Noncombustible construction. Fire-resistance ratings of as high as 4 hours are easily achieved with applied fireproofing or an appropriately fire resistive ceiling. Some building codes also allow reduced fire protection or exposed steel for roof structures that are 15 to 25 ft (4.6 to 7.6 m) or more above the floor.



mm) are available as standard rolled sections. Greater depth beams capable of longer spans may be shop fabricated. 4

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QUESTION SEVEN continued...



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QUESTION SEVEN continued...



This chart is for wood floor joists with residential floor loads. For larger loads, increase the indicated joist size by one size (plus 2 in., or 50 mm). For ceiling joists supporting only residential attic loads, decrease the indicated joist size by one size (less 2 in., or 50 mm).

THE STRUCTURAL SYSTEM

SIZING

55

□ Strong woods include Douglas Fir, Larch, Southern Pine, and Oak. □ For 12-in. (305-mm) joist spacings, increase allowable spans 1 to 2 ft (0.3 to 0.6 m). For 24-in. (610-mm) joist spacings, decrease allowable spans 1 to 2 ft (0.3 to 0.6 m).

□ Most often wood floor joists are spaced 16 in. (406 mm) center-tocenter. Spacings of 12 and 24 in. (305 and 610 mm) are also used. In all cases members should fall on a 4-ft. (1219-mm) module to coordinate with the standard width of various panel products that are used as an integral part of this system.

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QUESTION SEVEN continued...



QUESTION SEVEN continued...

- 7.1. Based on the above drawing (plan), provide nominal depths for the I-beam bearers (girders), SA pine joists, and oak decking see attached pages from *The Architect's Studio Companion*. Do not be concerned with standard sizes for the purposes of this question. (15)
- 7.2. Based on the same drawing, provide a detailed plan and sections for DETAILA. Specifically, detail the connection between the I-beam and the wall, the joists and the I-beam and the timber decking and the joists. Your solution should be both practical and poetic. (15)

QUESTION EIGHT

What issues need to be dealt with in terms of connecting to the ground? Connection to the sky? Turning a corner? And dealing with openings? Provide at least 3 issues per connection. Provide diagrams where relevant. (12)

QUESTION NINE

What is the difference between a pin joint, a roller connection and a fixed connection? Give an example of where you would use each (12)

QUESTION TEN

What is the difference between a strip foundation, a raft foundation and piles? Why would one foundation type be used instead of another? What are the advantages and disadvantages of each? (12)

QUESTION ELEVEN

For the Denver Informal Settlement project, you were asked to identify a series of issues that needed to be addressed? What issues did you identify and how did you propose to resolve them? Based on your final crit for the project, how could your resolution been improved upon? (15)

QUESTION TWELVE

What issues or mistakes did you encounter in the construction of the full-scale detail project? How would you deal with those issues differently in the future? Please

answer in terms of both the actual construction phase as well as the documentation phase (15)

QUESTION THIRTEEN

What are the 2 main principles of keeping water out of a building? Give an example of how each of these can be achieved. (8)