



FACULTY ART DESIGN AND ARCHITECTURE

2015 November

Main Assessment

DEPARTMENT OF ARCHITECTURE

<u>MODULE NAME</u>	:	Construction and Detailing 3
<u>MODULE CODE</u>	:	ATC 3 11
<u>DATE</u>	:	6 November 2015
<u>DURATION</u>	:	180 minutes
<u>TIME</u>	:	08 :30
<u>TOTAL MARKS</u>	:	200

<u>ASSESSOR(S)</u>	:	JASON FRENKEL
<u>MODERATOR(S)</u>	:	DIRK BAHMANN
<u>NUMBER OF PAGES:</u>	:	8

INSTRUCTIONS TO CANDIDATES:

- Question papers must be handed in.
- This is a closed 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

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

QUESTION TWO

When does the design process end? (5)

QUESTION THREE

Explain the following quote by Alvaar Aalto and how it relates to the theoretical underpinning for this course: "Nothing is as dangerous in architecture as dealing with separated problems. If we split life into separated problems we split the possibilities to make good building art." (10)

QUESTION FOUR

Define the following terms/concepts and provide an example for each:

- a. Temporal contingency(5)
- b. Critical path(5)
- c. Tectonic expression(5)
- d. Holographic Approach to Detailing (5)

QUESTION FIVE

What are the two aspects of construction that a Written Specification describes?
Which professional is responsible for compiling the Written Specification? (10)

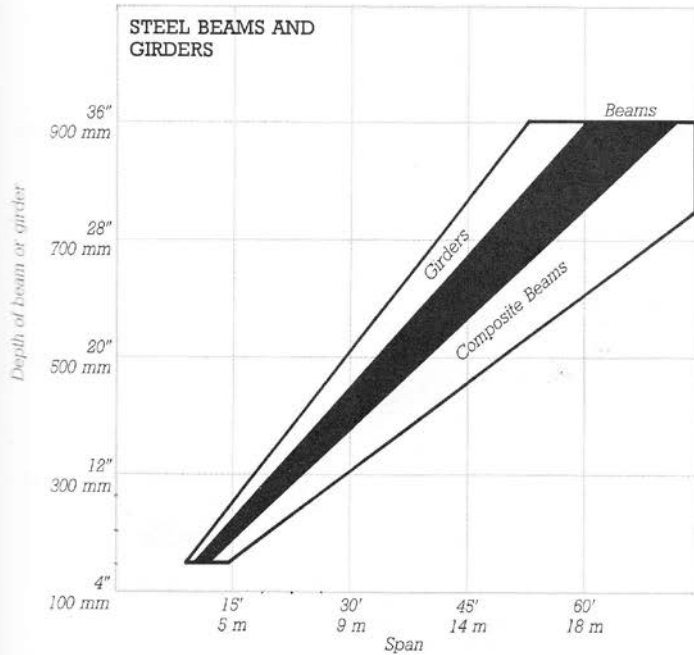
QUESTION SIX

6.1. You have been given a design project which entails a covered patio. After a thorough investigation, you determine that a relevant concept is 'heaviness vs. lightness', and you would like to express that concept through the detail of how your columns/posts/piers touch the ground. Draw one detail which expresses 'heaviness' and one detail which expresses 'lightness'. The choice of materials and construction methodologies is entirely up to you. Be sure to draw the details from as many views as you think are required and include as much detail as possible. Provide a brief explanation as to how your detail expresses the concept. (30)

6.2. Provide supporting documentation for your detail, in the form of a Written Specification, UNPRICED Bill of Quantities (material only), and Construction Programme. ENSURE THAT THESE DOCUMENTS ARE NO MORE THAN ONE PAGE EACH! Note, I am looking for quality over quantity – i.e. a highly detailed specification which only focuses on a small aspect of the detail is far preferable to a vague specification which focuses on the entirety of the detail. (30)

- **QUESTION SEVEN**

STEEL BEAMS AND GIRDERS



This chart is for steel wide-flange beams and girders. For average and light loads, read toward the right in the indicated areas. For heavy loads, read toward the left.

□ For beams acting as girders or as composite beams, read in the open areas indicated.

□ Beams or girders also acting as part of a rigid frame for lateral stability may be deeper than indicated by this chart.

□ Typical widths of beams and girders range from approximately one-third to one-half the depth of the member. Heavy sections used for heavy loads or to conserve depth may be wider.

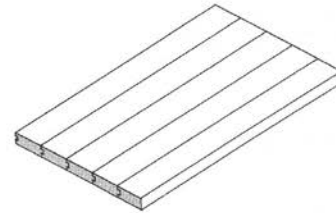
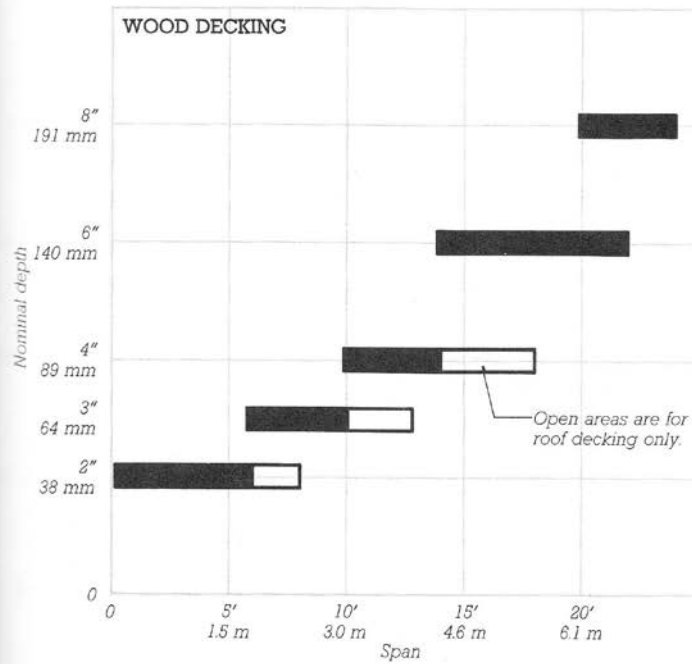
□ Depths of up to 36 in. (914 mm) are available as standard rolled sections. Greater depth beams capable of longer spans may be shop fabricated.

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 resistant 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.

QUESTION SEVEN continued...

WOOD DECKING



This chart is for solid or laminated wood decking. For light loads or strong woods, read toward the right in the indicated areas. For large loads or normal woods, read toward the left.

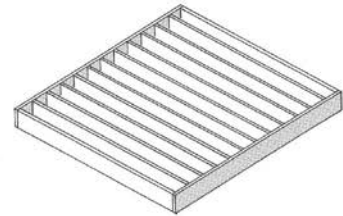
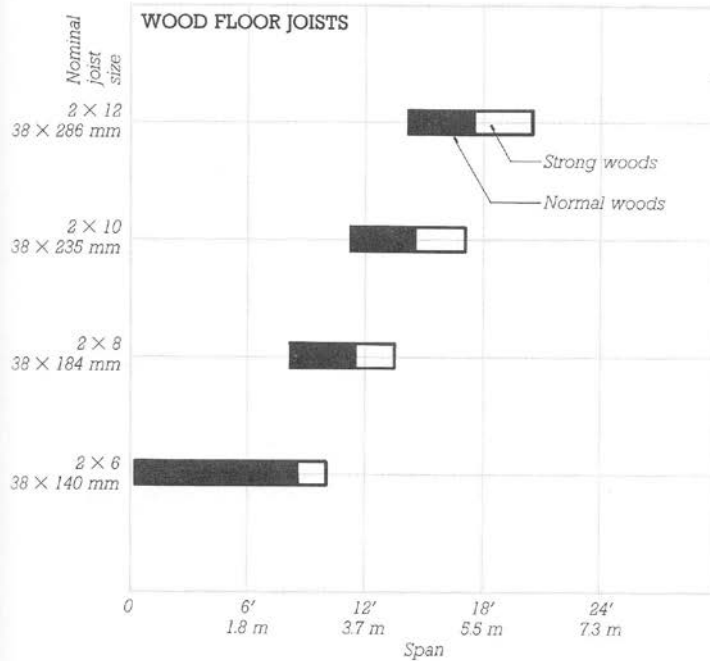
□ Strong woods include Douglas Fir, Larch, Southern Pine, and Oak.

□ Decking comes in various nominal widths, 6 and 8 in. (150 and 200 mm) being the most common. Actual depth is 1/2 in. (13 mm) less than nominal.

□ Allow approximately 3/4 in. (19 mm) for the depth of finish flooring.

QUESTION SEVEN continued...

WOOD FLOOR JOISTS



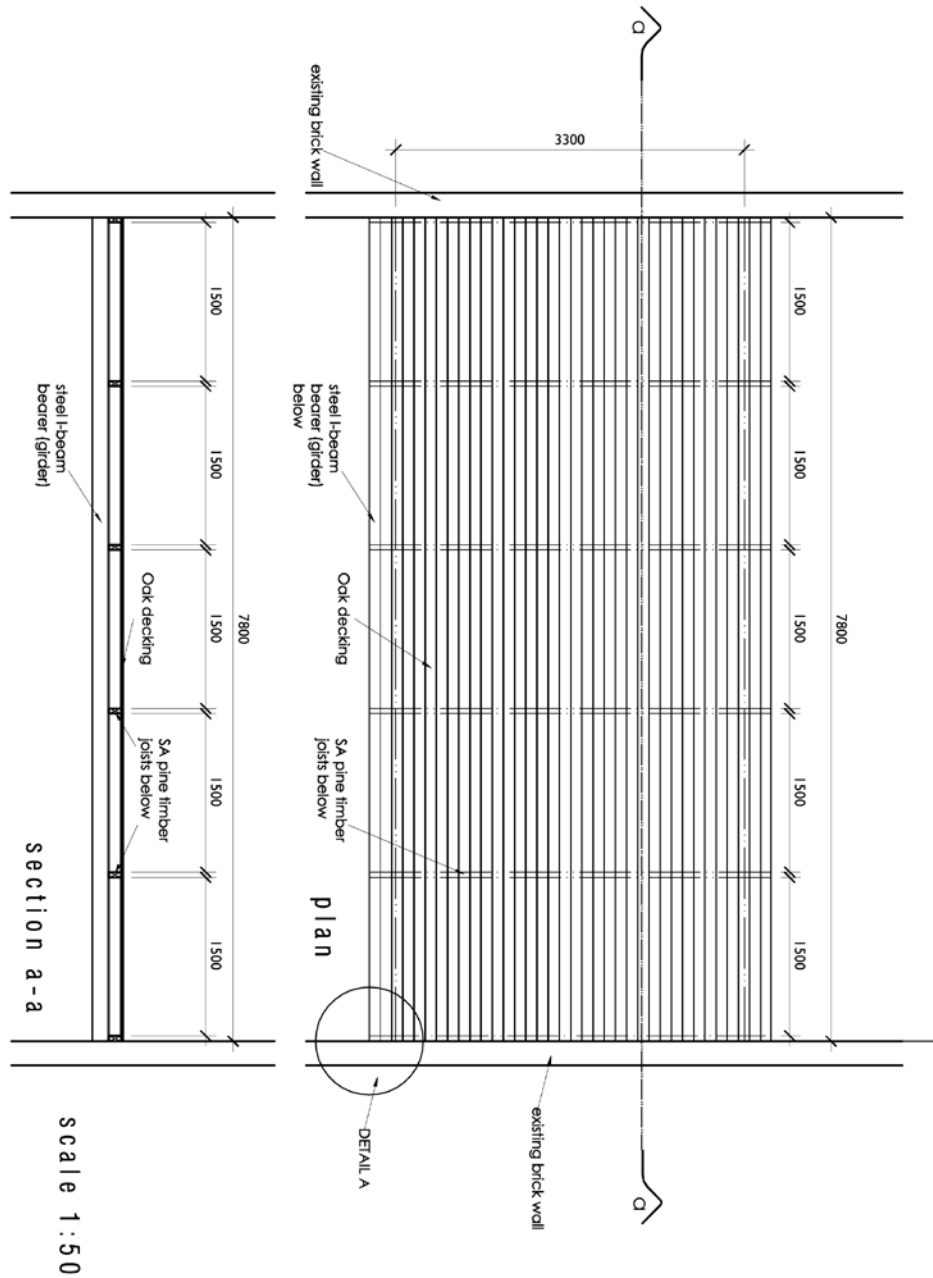
This chart is for wood floor joists with residential floor loads. For larger loads, increase the indicated joist size by one size (plus 2 in., or 50 mm). For ceiling joists supporting only residential attic loads, decrease the indicated joist size by one size (less 2 in., or 50 mm).

□ 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-to-center. 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.

QUESTION SEVEN continued...



QUESTION SEVEN continued...

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)

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. (24)

QUESTION NINE

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? (15)

QUESTION TEN

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. (20)

QUESTION ELEVEN

What are the 2 main principles of keeping water out of a building? Provide an example of how each principle can be achieved. (10)

QUESTION TWELVE

Fill in the blank: in considering a critical detail, the following issues must be engaged with: Form, _____, M_____ and _____ (6)