University of South Australia | Online

UO STRUCTURES 1 - ASSESSMENT

Assessment Name	Assessment – Truss Design Report
Test Available from **Test Due**	
Weighting	**% of the total grade for this course**
File Type to submit	One **.doc* or **.docx* file, with a maximum file size of 100MB

TRUSS ANALYSIS AND DESIGN REPORT TEST COURSE OBJECTIVES:

It is beneficial to familiarise yourself with the relationship between the assessment and the course objectives.

- CO1: acting on structures and determine costs and use this to justify design decisions.
- CO2: support reactions, shear forces, bending moments and deflections.

ASSESSMENT SUMMARY:

COMPONENTS	COURSE OBJECTIVES	WEIGHTING	DUE DATE	DETAILS	SUBMISSION PROCESS
2 Questions	CO 1, 2	%			Online

ASSESSMENT DESCRIPTION

In this test, please apply the relevant concepts covered in this course. In the first question, design different members of a truss. Where relevant, reference the relevant Australian Standard Loading Codes AS1170 and ASI Design Capacity Tables for Structural Steel.

Resources from weeks 1 - 10 will be a valuable reference.

UO Structures 1 Test Instructions

Read this page in detail

- The Test is out of 100 marks and is worth 35% of overall course grade
- Answer All Questions
- All Calculations must be typed, preferably using the Word Equation Editor. Handwritten calculations will not be assessed.

  * Preferably, type the calculations using equation editor in MS Word.

  *Excel spreadsheets and software analysis tools will not be accepted for submission.

- Word document submission only
  - Excel spreadsheets and software analysis tools will not be accepted for submission
- Where relevant, **diagrams must be included with calculations (e.g. Free body diagrams, tributary areas)** and these can be hand drawn and scanned in.
  - Clear and informative diagrams can help the assessor follow your calculations and reasoning.
- For **full marks** for any part of a question, working must be displayed and units must be correct at every step of working.
  - For example, in Question 1 Part A the correct support reactions with no working or free body diagram(s) to show how the support reactions were obtained, will only score 1 out of 10 for that part.
- The marks for each part are **underlined in bold font**
- Answers are to be correct to 2 decimal place.
  - For example, an answer of "The force in member YZ is 125.367 kN (Compression)" can be written as *The force in member YZ is 125.37 kN (Compression)*
  - For example, an answer of "The force in member YZ is 300.00 kN (Compression)" can be written as *The force in member YZ is 300 kN (Compression)*
- The *Design Properties and Capacity Tables* can be found in Course Information section and also in the **Assessment 2** Section on the Course website.
- You will need to access the Australian Standards, especially AS/NZS 1170.1:2002 via Techstreet at the UniSA Library.

Student Name: Benjamin Clark

Student Email: ben.clark@example.com

QUESTION 1:

A simple pin-jointed truss is loaded with a vertical force of 1000â€¯N at joint C. Using the method of joints, determine the internal forces in members AC, BC, and CD. Indicate whether the forces are tensile or compressive.

QUESTION 2:

For the truss shown, with support A pinned and support E on a roller, calculate the support reactions at A and E. The truss carries a uniform vertical load on joint C. Assume all members are weightless.

QUESTION 3:

Using the method of sections, determine the forces in members EF, DF, and DE of the loaded truss. A vertical load of 1200â€¯N is applied at joint F. Clearly show your section and assumptions.

QUESTION 4:

A Pratt truss is subjected to vertical loads at the top and bottom chords. Explain how zero-force members are identified in a truss structure and identify all zero-force members in the given configuration.

QUESTION 5:

Given a Warren truss with a span of 6â€¯m and equal panel lengths, determine the maximum force in any member when a point load of 1500â€¯N is applied at the center-top joint. Use symmetry in your analysis.

QUESTION 6:

Design an appropriate cross-section for a truss member experiencing a compressive force of 18â€¯kN. The material is structural steel with a yield strength of 250â€¯MPa, and a factor of safety of 1.5 is required. Show all calculations including buckling checks.

Parameter Table

Parameter	Value

LoadAtJointC_N	942
LoadAtJointF_N	1100
UniformLoadAtJointC_N	972
PointLoadAtTopCenterJoint_N	1377
TrussSpan_m	4
CompressiveForce_kN	16
YieldStrength_MPa	297
FactorOfSafety	1.55

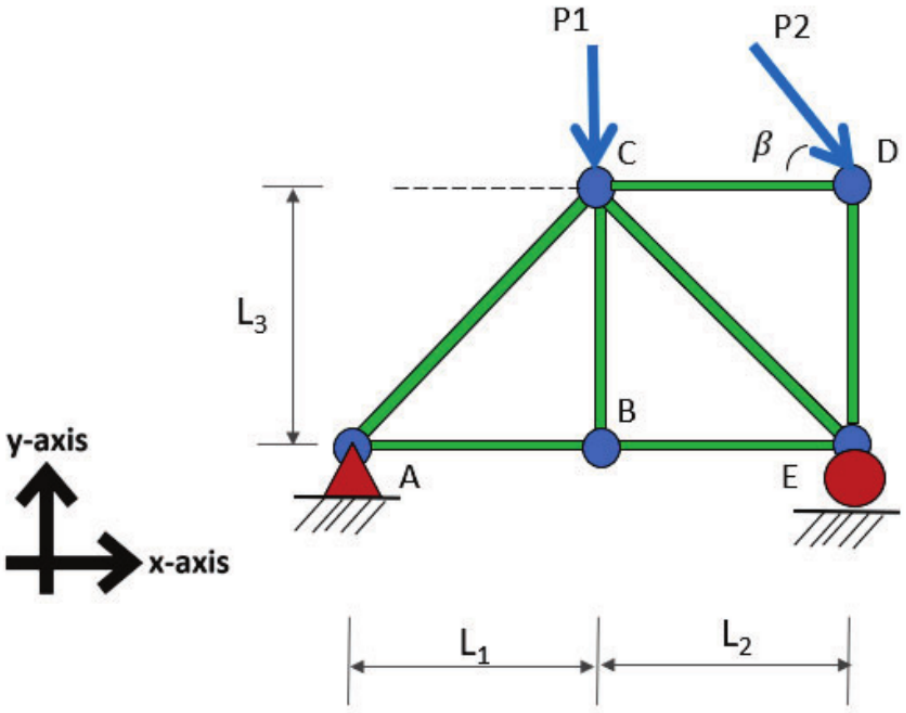

Figure 1: Steel Truss with bolted connections