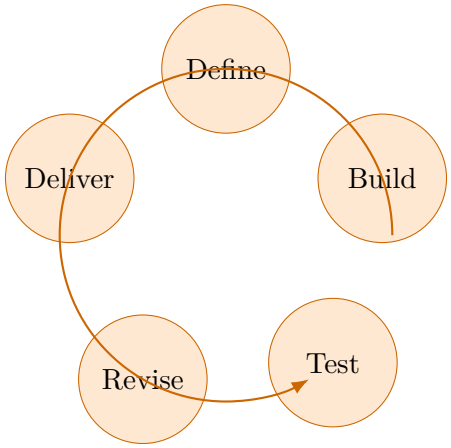
Summit CIVL 420: Structural Design II

Summit fully illustrated textbook edition



Original Summit-authored instructional text generated from the live course runtime, bibliography layer, and assessment structure.

March 22, 2026

@@TOKEN_0@@ Summit first edition draft @@TOKEN_1@@ college @@TOKEN_2@@ 3 @@TOKEN_3@@ 14 weeks @@TOKEN_4@@ 9.6 hours/week

Originality note

This textbook is a Summit-authored instructional text. It is informed by the course bibliography in @@TOKEN_0@@ and by open academic references used elsewhere in Summit, but it does not copy or restate any single commercial textbook.

How this textbook was built

This book was generated from the live Summit course runtime for Structural Design II: the syllabus, lesson sequence, reading chapters, guided practice, homework sets, quizzes, mastery exam, and workload standard. The design goal is to give a student a usable, course-complete book while preserving original Summit wording and sequencing.

A Summit-authored continuation of structural design focused on integrated systems, connections, lateral behavior, and multi-member coordination.

Design chapters should be read as iterative decision-making documents. Requirements, assumptions, tradeoffs, and communication are the core substance of the work.

This volume is structured as a teaching book rather than a bare note pack. Every chapter contains explanation, worked examples, guided practice, chapter homework, and a rear answer key so the student can study independently and still get disciplined feedback.

Course use guide

- Read one chapter at a time in sequence; each chapter is aligned to a live lesson block in the course workspace.
- Rebuild the worked examples before attempting the graded homework or quiz material.
- Keep a scratch notebook beside the text and write down assumptions, diagrams, and the points where you usually get stuck.
- Use the course tutor, guided practice, and homework only after you can explain the chapter in your own words.

Contents

Course map

- 4 live lesson chapters
- 4 graded homework checkpoints
- 4 timed quizzes
- 1 cumulative mastery exam
- 5 declared course outcomes

Prerequisite and readiness position

Course prerequisites: structural-design-i.

This course assumes the student can already use the prerequisite tools without re-learning them during the semester. Summit treats those prior requirements as active working knowledge, not as paperwork only.

Semester workload standard

Summit models this course as @@TOKEN_0@@ across a 14-week term plus final assessment window. The expected distribution is:

- Contact-equivalent instruction: 42 hours
- Reading: 16 hours
- Practice and problem solving: 24 hours
- Homework: 18 hours
- Lab, design, and reporting: 20 hours
- Exam preparation: 15 hours

Expected volume:

- 85-110 advanced member, frame, and connection-design exercises with code-based checks.
- 8-10 graded assignments mixing calculations, sketches, and short technical justifications.
- 6-8 calculation packages, design summaries, or review-style structural submittals.

Reference basis

Primary synthesis anchors from the bibliography for this course (50 listed references total):

1. Engineering Mechanics: Statics
2. Engineering Mechanics: Dynamics
3. Mechanics of Materials
4. Engineering Mechanics
5. Structural Analysis
6. Engineering Mechanics
7. Engineering Mechanics
8. Engineering Mechanics

Chapter 1

Chapter 1 System behavior and load path integration

Chapter purpose

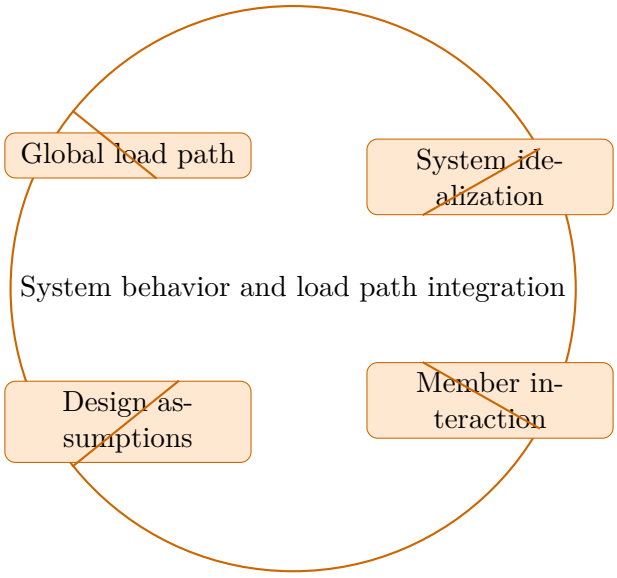
Students begin by connecting individual members into coordinated structural systems.

This chapter sits at the opening of Structural Design II. It develops Global load path, System idealization, Member interaction, and Design assumptions so that the student can move from explanation to execution without losing the thread of the course.

This chapter belongs to a family where the final artifact is rarely one equation or one answer. Instead, the student must combine analysis, judgment, iteration, and communication into a defensible design path. The text therefore treats process discipline as seriously as technical depth.

Core ideas

- Global load path
- System idealization
- Member interaction
- Design assumptions



How to think through this chapter

A strong method in this family begins with requirements, constraints, and stakeholders, then moves through alternatives, screening criteria, and progressively more detailed justification. Every major decision should be traceable and reviewable by another engineer.

When working this chapter, keep the following question active: @@TOKEN_0@@ A good student answer should connect setup, assumptions, and conclusion instead of only chasing a final number or sentence.

CIVL 420 Structural Design II. System behavior and load path integration. This chapter explains why the topic matters, how strong students organize the work, and what separates a defensible submission from a shallow one in this unit.

Why System behavior and load path integration is a design decision, not a lookup exercise

System behavior and load path integration is really a decision-making chapter. The mathematics, code checks, and concept comparisons matter because they push the student toward one defensible recommendation and away from weaker ones.

In Structural Design II, this is where students learn not to confuse a formula with a decision. The formula only matters because it changes how global load path should be judged.

How global load path and system idealization drive the option screen

A strong student starts by naming the constraints, criteria, and failure points. Only then does global load path become useful, because now it sits inside a real decision frame rather than floating as isolated content.

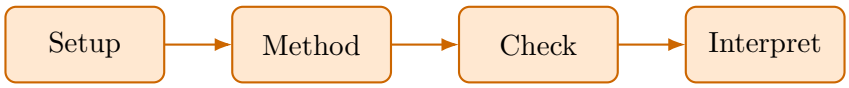
System idealization usually supplies the second check that keeps the recommendation honest. Good design work is rarely driven by one number alone.

How review-ready design work differs from draft thinking

Review-ready design work shows the option screen, the governing check, and the reason one direction survives while another does not. Weak work jumps too quickly from calculation to recommendation without showing the selection logic.

The easiest way to improve these chapters is to write the design rationale as if another engineer must sign it tomorrow.

Worked example



@@TOKEN_0@@ Walk through a structural design ii design check built around global load path and system idealization.

1. Define the performance goal, constraints, and the standard the design must satisfy.
2. Compare the relevant options or checks with global load path as the controlling criterion.
3. Record the governing assumptions, demand-capacity logic, or decision screen in a reviewable order.
4. State the selected direction and explain why it is the strongest engineering choice.

Read this example twice: once for the flow of ideas and once for the technical structure of the solution.

Worked-through guided example

@@TOKEN_0@@ Work a structural design ii decision problem where global load path changes the preferred option or the governing design check.

1. List the criteria, constraints, and what counts as an acceptable design path.
2. Use global load path to compare the available options or checks in a reviewable order.
3. Close with the option you would defend and the reason it survives review.

A complete design response frames the criteria, shows how global load path drives the decision, and documents the recommendation in a review-ready sequence.

Instructor commentary

Students should annotate this chapter for structure, not just facts. Mark where the argument changes direction, where the method requires a hidden assumption, and where the conclusion becomes more general than the worked example. If the chapter feels easy while you are reading it but difficult when you close the page, you have not yet converted recognition into mastery.

The right study pattern is define the problem, build options, evaluate tradeoffs, document the decision, and then revisit the work after critique.

Practice while you read

Practice Set 1: System behavior and load path integration

Students begin by connecting individual members into coordinated structural systems.

@@TOKEN_0@@ Work a structural design ii decision problem where global load path changes the preferred option or the governing design check.

- Hint: List the constraints and criteria first. Then show how global load path changes the option screen or final recommendation.
- Step 1: List the criteria, constraints, and what counts as an acceptable design path.
- Step 2: Use global load path to compare the available options or checks in a reviewable order.
- Step 3: Close with the option you would defend and the reason it survives review.
- Checkpoint: A strong checkpoint answer shows the governing criteria, explains how global load path changes the option screen, and lands on a defensible recommendation.

@@TOKEN_0@@ Work a structural design ii decision problem where system idealization changes the preferred option or the governing design check.

- Hint: List the constraints and criteria first. Then show how system idealization changes the option screen or final recommendation.
- Step 1: List the criteria, constraints, and what counts as an acceptable design path.

- Step 2: Use system idealization to compare the available options or checks in a reviewable order.
- Step 3: Close with the option you would defend and the reason it survives review.
- Checkpoint: A strong checkpoint answer shows the governing criteria, explains how system idealization changes the option screen, and lands on a defensible recommendation.

Chapter homework

@@TOKEN_0@@ Students begin by connecting individual members into coordinated structural systems.

1. Prepare a structural design ii design check or option screen focused on global load path. Show the governing criteria, tradeoffs, and the recommendation you would defend.
2. Prepare a structural design ii design check or option screen focused on system idealization. Show the governing criteria, tradeoffs, and the recommendation you would defend.
3. Prepare a structural design ii design check or option screen focused on member interaction. Show the governing criteria, tradeoffs, and the recommendation you would defend.
4. Prepare a structural design ii design check or option screen focused on design assumptions. Show the governing criteria, tradeoffs, and the recommendation you would defend.

Answers for these homework problems appear in the back-of-book answer key.

Chapter summary and study notes

- Define the governing criteria behind global load path before comparing options.
- Show how system idealization drives the recommendation.
- Document the decision path clearly enough for a review or design defense.

Study tips

- Write the criteria and constraints before comparing any option.
- Keep global load path visible as a decision driver, not just a calculation step.
- Show why the recommended option survives review instead of only naming it.

Common traps

- Treating a design formula like the recommendation itself.

- Skipping the explicit criteria or constraints that govern the decision.
- Presenting the final choice without showing the option screen or review logic.

Family-level errors to watch for

- Jumping to a favored concept before writing requirements and criteria.
- Hiding assumptions or tradeoffs that control the decision.
- Producing calculations without a coherent design narrative or review trail.

Chapter 2

Chapter 2 Connections, detailing, and constructability

Chapter purpose

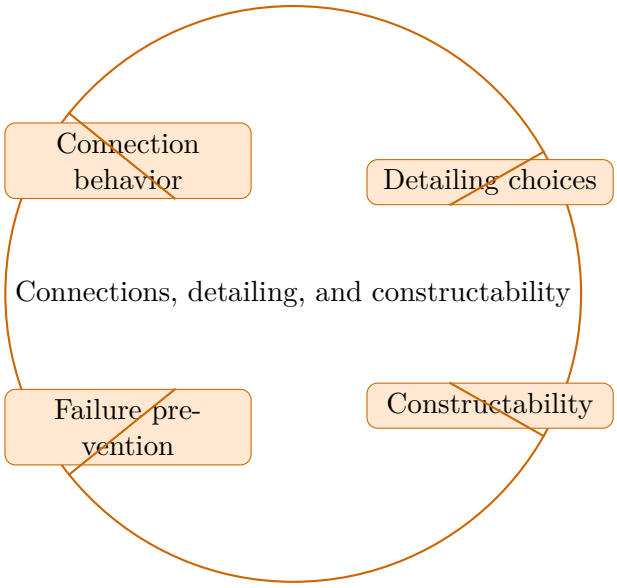
The course turns to how connection logic and detailing choices affect structural performance.

This chapter sits in the middle of Structural Design II. It develops Connection behavior, Detailing choices, Constructability, and Failure prevention so that the student can move from explanation to execution without losing the thread of the course.

This chapter belongs to a family where the final artifact is rarely one equation or one answer. Instead, the student must combine analysis, judgment, iteration, and communication into a defensible design path. The text therefore treats process discipline as seriously as technical depth.

Core ideas

- Connection behavior
- Detailing choices
- Constructability
- Failure prevention



How to think through this chapter

A strong method in this family begins with requirements, constraints, and stakeholders, then moves through alternatives, screening criteria, and progressively more detailed justification. Every major decision should be traceable and reviewable by another engineer.

When working this chapter, keep the following question active: @@TOKEN_0@@ A good student answer should connect setup, assumptions, and conclusion instead of only chasing a final number or sentence.

CIVL 420 Structural Design II. Connections, detailing, and constructability. This chapter explains why the topic matters, how strong students organize the work, and what separates a defensible submission from a shallow one in this unit.

Why Connections, detailing, and constructability is a design decision, not a lookup exercise

Connections, detailing, and constructability is really a decision-making chapter. The mathematics, code checks, and concept comparisons matter because they push the student toward one defensible recommendation and away from weaker ones.

In Structural Design II, this is where students learn not to confuse a formula with a decision. The formula only matters because it changes how connection behavior should be judged.

How connection behavior and detailing choices drive the option screen

A strong student starts by naming the constraints, criteria, and failure points. Only then does connection behavior become useful, because now it sits inside a real decision frame rather than floating as isolated content.

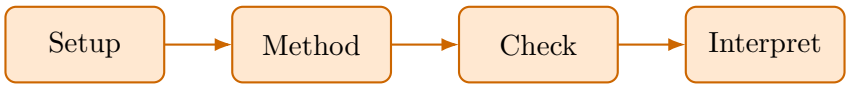
Detailing choices usually supplies the second check that keeps the recommendation honest. Good design work is rarely driven by one number alone.

How review-ready design work differs from draft thinking

Review-ready design work shows the option screen, the governing check, and the reason one direction survives while another does not. Weak work jumps too quickly from calculation to recommendation without showing the selection logic.

The easiest way to improve these chapters is to write the design rationale as if another engineer must sign it tomorrow.

Worked example



@@TOKEN_0@@ Walk through a structural design ii design check built around connection behavior and detailing choices.

1. Define the performance goal, constraints, and the standard the design must satisfy.
2. Compare the relevant options or checks with connection behavior as the controlling criterion.
3. Record the governing assumptions, demand-capacity logic, or decision screen in a reviewable order.
4. State the selected direction and explain why it is the strongest engineering choice.

Read this example twice: once for the flow of ideas and once for the technical structure of the solution.

Worked-through guided example

@@TOKEN_0@@ Work a structural design ii decision problem where connection behavior changes the preferred option or the governing design check.

1. List the criteria, constraints, and what counts as an acceptable design path.
2. Use connection behavior to compare the available options or checks in a reviewable order.
3. Close with the option you would defend and the reason it survives review.

A complete design response frames the criteria, shows how connection behavior drives the decision, and documents the recommendation in a review-ready sequence.

Instructor commentary

Students should annotate this chapter for structure, not just facts. Mark where the argument changes direction, where the method requires a hidden assumption, and where the conclusion becomes more general than the worked example. If the chapter feels easy while you are reading it but difficult when you close the page, you have not yet converted recognition into mastery.

The right study pattern is define the problem, build options, evaluate tradeoffs, document the decision, and then revisit the work after critique.

Practice while you read

Practice Set 2: Connections, detailing, and constructability

The course turns to how connection logic and detailing choices affect structural performance.

@@TOKEN_0@@ Work a structural design ii decision problem where connection behavior changes the preferred option or the governing design check.

- Hint: List the constraints and criteria first. Then show how connection behavior changes the option screen or final recommendation.
- Step 1: List the criteria, constraints, and what counts as an acceptable design path.
- Step 2: Use connection behavior to compare the available options or checks in a reviewable order.
- Step 3: Close with the option you would defend and the reason it survives review.
- Checkpoint: A strong checkpoint answer shows the governing criteria, explains how connection behavior changes the option screen, and lands on a defensible recommendation.

@@TOKEN_0@@ Work a structural design ii decision problem where detailing choices changes the preferred option or the governing design check.

- Hint: List the constraints and criteria first. Then show how detailing choices changes the option screen or final recommendation.
- Step 1: List the criteria, constraints, and what counts as an acceptable design path.

- Step 2: Use detailing choices to compare the available options or checks in a reviewable order.
- Step 3: Close with the option you would defend and the reason it survives review.
- Checkpoint: A strong checkpoint answer shows the governing criteria, explains how detailing choices changes the option screen, and lands on a defensible recommendation.

Chapter homework

@@TOKEN_0@@ The course turns to how connection logic and detailing choices affect structural performance.

1. Prepare a structural design ii design check or option screen focused on connection behavior. Show the governing criteria, tradeoffs, and the recommendation you would defend.
2. Prepare a structural design ii design check or option screen focused on detailing choices. Show the governing criteria, tradeoffs, and the recommendation you would defend.
3. Prepare a structural design ii design check or option screen focused on constructability. Show the governing criteria, tradeoffs, and the recommendation you would defend.
4. Prepare a structural design ii design check or option screen focused on failure prevention. Show the governing criteria, tradeoffs, and the recommendation you would defend.

Answers for these homework problems appear in the back-of-book answer key.

Chapter summary and study notes

- Define the governing criteria behind connection behavior before comparing options.
- Show how detailing choices drives the recommendation.
- Document the decision path clearly enough for a review or design defense.

Study tips

- Write the criteria and constraints before comparing any option.
- Keep connection behavior visible as a decision driver, not just a calculation step.
- Show why the recommended option survives review instead of only naming it.

Common traps

- Treating a design formula like the recommendation itself.

- Skipping the explicit criteria or constraints that govern the decision.
- Presenting the final choice without showing the option screen or review logic.

Family-level errors to watch for

- Jumping to a favored concept before writing requirements and criteria.
- Hiding assumptions or tradeoffs that control the decision.
- Producing calculations without a coherent design narrative or review trail.

Chapter 3

Chapter 3 Lateral systems and service performance

Chapter purpose

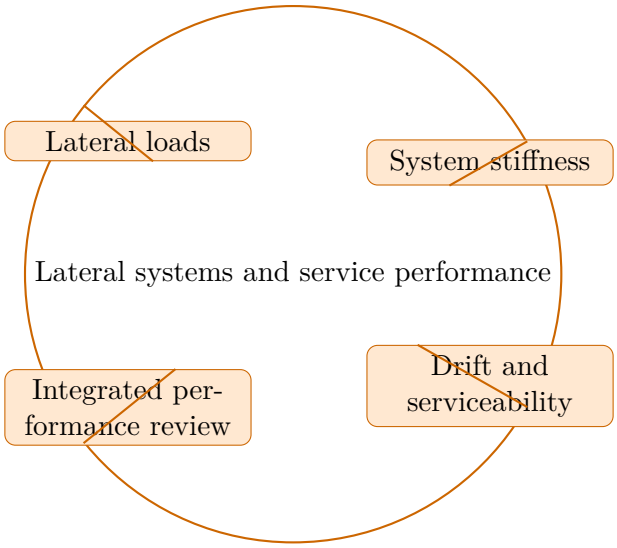
Students analyze lateral resistance, drift, system stability, and serviceability behavior.

This chapter sits in the middle of Structural Design II. It develops Lateral loads, System stiffness, Drift and serviceability, and Integrated performance review so that the student can move from explanation to execution without losing the thread of the course.

This chapter belongs to a family where the final artifact is rarely one equation or one answer. Instead, the student must combine analysis, judgment, iteration, and communication into a defensible design path. The text therefore treats process discipline as seriously as technical depth.

Core ideas

- Lateral loads
- System stiffness
- Drift and serviceability
- Integrated performance review



How to think through this chapter

A strong method in this family begins with requirements, constraints, and stakeholders, then moves through alternatives, screening criteria, and progressively more detailed justification. Every major decision should be traceable and reviewable by another engineer.

When working this chapter, keep the following question active: @@TOKEN_0@@ A good student answer should connect setup, assumptions, and conclusion instead of only chasing a final number or sentence.

CIVL 420 Structural Design II. Lateral systems and service performance. This chapter explains why the topic matters, how strong students organize the work, and what separates a defensible submission from a shallow one in this unit.

Why Lateral systems and service performance is a design decision, not a lookup exercise

Lateral systems and service performance is really a decision-making chapter. The mathematics, code checks, and concept comparisons matter because they push the student toward one defensible recommendation and away from weaker ones.

In Structural Design II, this is where students learn not to confuse a formula with a decision. The formula only matters because it changes how lateral loads should be judged.

How lateral loads and system stiffness drive the option screen

A strong student starts by naming the constraints, criteria, and failure points. Only then does lateral loads become useful, because now it sits inside a real decision frame rather than floating as

isolated content.

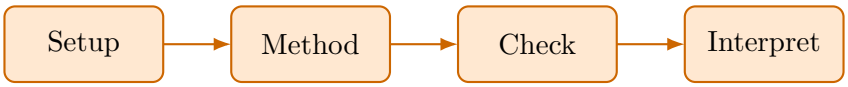
System stiffness usually supplies the second check that keeps the recommendation honest. Good design work is rarely driven by one number alone.

How review-ready design work differs from draft thinking

Review-ready design work shows the option screen, the governing check, and the reason one direction survives while another does not. Weak work jumps too quickly from calculation to recommendation without showing the selection logic.

The easiest way to improve these chapters is to write the design rationale as if another engineer must sign it tomorrow.

Worked example



@@TOKEN_0@@ Walk through a structural design ii design check built around lateral loads and system stiffness.

1. Define the performance goal, constraints, and the standard the design must satisfy.
2. Compare the relevant options or checks with lateral loads as the controlling criterion.
3. Record the governing assumptions, demand-capacity logic, or decision screen in a reviewable order.
4. State the selected direction and explain why it is the strongest engineering choice.

Read this example twice: once for the flow of ideas and once for the technical structure of the solution.

Worked-through guided example

@@TOKEN_0@@ Work a structural design ii decision problem where lateral loads changes the preferred option or the governing design check.

1. List the criteria, constraints, and what counts as an acceptable design path.
2. Use lateral loads to compare the available options or checks in a reviewable order.
3. Close with the option you would defend and the reason it survives review.

A complete design response frames the criteria, shows how lateral loads drives the decision, and documents the recommendation in a review-ready sequence.

Instructor commentary

Students should annotate this chapter for structure, not just facts. Mark where the argument changes direction, where the method requires a hidden assumption, and where the conclusion becomes more general than the worked example. If the chapter feels easy while you are reading it but difficult when you close the page, you have not yet converted recognition into mastery.

The right study pattern is define the problem, build options, evaluate tradeoffs, document the decision, and then revisit the work after critique.

Practice while you read

Practice Set 3: Lateral systems and service performance

Students analyze lateral resistance, drift, system stability, and serviceability behavior.

@@TOKEN_0@@ Work a structural design ii decision problem where lateral loads changes the preferred option or the governing design check.

- Hint: List the constraints and criteria first. Then show how lateral loads changes the option screen or final recommendation.
- Step 1: List the criteria, constraints, and what counts as an acceptable design path.
- Step 2: Use lateral loads to compare the available options or checks in a reviewable order.
- Step 3: Close with the option you would defend and the reason it survives review.
- Checkpoint: A strong checkpoint answer shows the governing criteria, explains how lateral loads changes the option screen, and lands on a defensible recommendation.

@@TOKEN_0@@ Work a structural design ii decision problem where system stiffness changes the preferred option or the governing design check.

- Hint: List the constraints and criteria first. Then show how system stiffness changes the option screen or final recommendation.
- Step 1: List the criteria, constraints, and what counts as an acceptable design path.
- Step 2: Use system stiffness to compare the available options or checks in a reviewable order.
- Step 3: Close with the option you would defend and the reason it survives review.
- Checkpoint: A strong checkpoint answer shows the governing criteria, explains how system stiffness changes the option screen, and lands on a defensible recommendation.

Chapter homework

@@TOKEN_0@@ Students analyze lateral resistance, drift, system stability, and serviceability behavior.

1. Prepare a structural design ii design check or option screen focused on lateral loads. Show the governing criteria, tradeoffs, and the recommendation you would defend.
2. Prepare a structural design ii design check or option screen focused on system stiffness. Show the governing criteria, tradeoffs, and the recommendation you would defend.
3. Prepare a structural design ii design check or option screen focused on drift and serviceability. Show the governing criteria, tradeoffs, and the recommendation you would defend.
4. Prepare a structural design ii design check or option screen focused on integrated performance review. Show the governing criteria, tradeoffs, and the recommendation you would defend.

Answers for these homework problems appear in the back-of-book answer key.

Chapter summary and study notes

- Define the governing criteria behind lateral loads before comparing options.
- Show how system stiffness drives the recommendation.
- Document the decision path clearly enough for a review or design defense.

Study tips

- Write the criteria and constraints before comparing any option.
- Keep lateral loads visible as a decision driver, not just a calculation step.
- Show why the recommended option survives review instead of only naming it.

Common traps

- Treating a design formula like the recommendation itself.
- Skipping the explicit criteria or constraints that govern the decision.
- Presenting the final choice without showing the option screen or review logic.

Family-level errors to watch for

- Jumping to a favored concept before writing requirements and criteria.
- Hiding assumptions or tradeoffs that control the decision.
- Producing calculations without a coherent design narrative or review trail.

Chapter 4

Chapter 4 Integrated structural design package

Chapter purpose

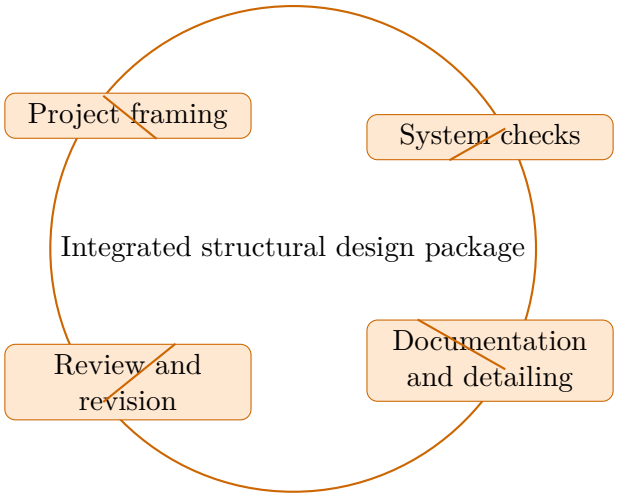
The semester closes with a coordinated design submission for a multi-member system.

This chapter sits at the end of Structural Design II. It develops Project framing, System checks, Documentation and detailing, and Review and revision so that the student can move from explanation to execution without losing the thread of the course.

This chapter belongs to a family where the final artifact is rarely one equation or one answer. Instead, the student must combine analysis, judgment, iteration, and communication into a defensible design path. The text therefore treats process discipline as seriously as technical depth.

Core ideas

- Project framing
- System checks
- Documentation and detailing
- Review and revision



How to think through this chapter

A strong method in this family begins with requirements, constraints, and stakeholders, then moves through alternatives, screening criteria, and progressively more detailed justification. Every major decision should be traceable and reviewable by another engineer.

When working this chapter, keep the following question active: @@TOKEN_0@@ A good student answer should connect setup, assumptions, and conclusion instead of only chasing a final number or sentence.

CIVL 420 Structural Design II. Integrated structural design package. This chapter explains why the topic matters, how strong students organize the work, and what separates a defensible submission from a shallow one in this unit.

Why Integrated structural design package is a design decision, not a lookup exercise

Integrated structural design package is really a decision-making chapter. The mathematics, code checks, and concept comparisons matter because they push the student toward one defensible recommendation and away from weaker ones.

In Structural Design II, this is where students learn not to confuse a formula with a decision. The formula only matters because it changes how project framing should be judged.

How project framing and system checks drive the option screen

A strong student starts by naming the constraints, criteria, and failure points. Only then does project framing become useful, because now it sits inside a real decision frame rather than floating as isolated content.

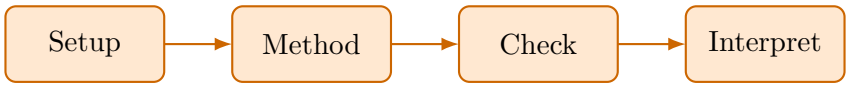
System checks usually supplies the second check that keeps the recommendation honest. Good design work is rarely driven by one number alone.

How review-ready design work differs from draft thinking

Review-ready design work shows the option screen, the governing check, and the reason one direction survives while another does not. Weak work jumps too quickly from calculation to recommendation without showing the selection logic.

The easiest way to improve these chapters is to write the design rationale as if another engineer must sign it tomorrow.

Worked example



@@TOKEN_0@@ Walk through a structural design ii design check built around project framing and system checks.

1. Define the performance goal, constraints, and the standard the design must satisfy.
2. Compare the relevant options or checks with project framing as the controlling criterion.
3. Record the governing assumptions, demand-capacity logic, or decision screen in a reviewable order.
4. State the selected direction and explain why it is the strongest engineering choice.

Read this example twice: once for the flow of ideas and once for the technical structure of the solution.

Worked-through guided example

@@TOKEN_0@@ Work a structural design ii decision problem where project framing changes the preferred option or the governing design check.

1. List the criteria, constraints, and what counts as an acceptable design path.
2. Use project framing to compare the available options or checks in a reviewable order.
3. Close with the option you would defend and the reason it survives review.

A complete design response frames the criteria, shows how project framing drives the decision, and documents the recommendation in a review-ready sequence.

Instructor commentary

Students should annotate this chapter for structure, not just facts. Mark where the argument changes direction, where the method requires a hidden assumption, and where the conclusion becomes more general than the worked example. If the chapter feels easy while you are reading it but difficult when you close the page, you have not yet converted recognition into mastery.

The right study pattern is define the problem, build options, evaluate tradeoffs, document the decision, and then revisit the work after critique.

Practice while you read

Practice Set 4: Integrated structural design package

The semester closes with a coordinated design submission for a multi-member system.

@@TOKEN_0@@ Work a structural design ii decision problem where project framing changes the preferred option or the governing design check.

- Hint: List the constraints and criteria first. Then show how project framing changes the option screen or final recommendation.
- Step 1: List the criteria, constraints, and what counts as an acceptable design path.
- Step 2: Use project framing to compare the available options or checks in a reviewable order.
- Step 3: Close with the option you would defend and the reason it survives review.
- Checkpoint: A strong checkpoint answer shows the governing criteria, explains how project framing changes the option screen, and lands on a defensible recommendation.

@@TOKEN_0@@ Work a structural design ii decision problem where system checks changes the preferred option or the governing design check.

- Hint: List the constraints and criteria first. Then show how system checks changes the option screen or final recommendation.
- Step 1: List the criteria, constraints, and what counts as an acceptable design path.
- Step 2: Use system checks to compare the available options or checks in a reviewable order.
- Step 3: Close with the option you would defend and the reason it survives review.
- Checkpoint: A strong checkpoint answer shows the governing criteria, explains how system checks changes the option screen, and lands on a defensible recommendation.

Chapter homework

@@TOKEN_0@@ The semester closes with a coordinated design submission for a multi-member system.

1. Prepare a structural design ii design check or option screen focused on project framing. Show the governing criteria, tradeoffs, and the recommendation you would defend.
2. Prepare a structural design ii design check or option screen focused on system checks. Show the governing criteria, tradeoffs, and the recommendation you would defend.
3. Prepare a structural design ii design check or option screen focused on documentation and detailing. Show the governing criteria, tradeoffs, and the recommendation you would defend.
4. Prepare a structural design ii design check or option screen focused on review and revision. Show the governing criteria, tradeoffs, and the recommendation you would defend.

Answers for these homework problems appear in the back-of-book answer key.

Chapter summary and study notes

- Define the governing criteria behind project framing before comparing options.
- Show how system checks drives the recommendation.
- Document the decision path clearly enough for a review or design defense.

Study tips

- Write the criteria and constraints before comparing any option.
- Keep project framing visible as a decision driver, not just a calculation step.
- Show why the recommended option survives review instead of only naming it.

Common traps

- Treating a design formula like the recommendation itself.
- Skipping the explicit criteria or constraints that govern the decision.
- Presenting the final choice without showing the option screen or review logic.

Family-level errors to watch for

- Jumping to a favored concept before writing requirements and criteria.
- Hiding assumptions or tradeoffs that control the decision.
- Producing calculations without a coherent design narrative or review trail.

Chapter 5

Quiz review and official exam preparation

Homework structure

- Homework Set 1: System behavior and load path integration: 4 graded problems attached to chapter 1.
- Homework Set 2: Connections, detailing, and constructability: 4 graded problems attached to chapter 2.
- Homework Set 3: Lateral systems and service performance: 4 graded problems attached to chapter 3.
- Homework Set 4: Integrated structural design package: 4 graded problems attached to chapter 4.

Quiz structure

- Quiz 1: System behavior and load path integration: 4 questions, timed, and single-attempt in the live course. Quiz 1 should be taken only after you can solve the chapter homework without outside prompts.
- Quiz 2: Connections, detailing, and constructability: 4 questions, timed, and single-attempt in the live course. Quiz 2 should be taken only after you can solve the chapter homework without outside prompts.
- Quiz 3: Lateral systems and service performance: 4 questions, timed, and single-attempt in the live course. Quiz 3 should be taken only after you can solve the chapter homework without outside prompts.
- Quiz 4: Integrated structural design package: 4 questions, timed, and single-attempt in the live course. Quiz 4 should be taken only after you can solve the chapter homework without outside prompts.

Official mastery exam

- Structural Design II cumulative mastery exam: 5 major questions, High rigor, first official attempt locks the course grade.

Structural Design II cumulative mastery exam preparation checklist

- Review every unit in Structural Design II until you can explain the governing method or decision logic without notes.
- Redo the homework checkpoints and one full practice round before the official attempt.
- Expect Summit to grade setup quality, assumptions, interpretation, and conclusion, not only raw answers.
- Use the AI tutor and guided practice only until you can defend the work independently.

How to use this book before assessment

- Read the relevant chapter and rebuild both worked examples without looking.
- Solve the guided practice in the chapter before attempting the graded homework.
- Check your chapter-homework answers only after you complete a full written attempt.
- Review the quiz answer key after each chapter block and classify your errors by concept, setup, algebra, or interpretation.
- Before the official exam, revisit the chapter purposes, homework corrections, and answer-key notes rather than rereading formulas only.

Chapter 6

Course vocabulary index

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Chapter 7

Back-of-book answers and solution outlines

Guided practice answer key

Chapter 1: System behavior and load path integration

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1. Work a structural design ii decision problem where global load path changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how global load path changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how global load path drives the decision, and documents the recommendation in a review-ready sequence.

1. Work a structural design ii decision problem where system idealization changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how system idealization changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how system idealization drives the decision, and documents the recommendation in a review-ready sequence.

1. Work a structural design ii decision problem where member interaction changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how member interaction changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how member interaction drives the decision, and documents the recommendation in a review-ready sequence.

Chapter 2: Connections, detailing, and constructability

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1. Work a structural design ii decision problem where connection behavior changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how connection behavior changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how connection behavior drives the decision, and documents the recommendation in a review-ready sequence.

1. Work a structural design ii decision problem where detailing choices changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how detailing choices changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how detailing choices drives the decision, and documents the recommendation in a review-ready sequence.

1. Work a structural design ii decision problem where constructability changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how constructability changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how constructability drives the decision, and documents the recommendation in a review-ready sequence.

Chapter 3: Lateral systems and service performance

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1. Work a structural design ii decision problem where lateral loads changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how lateral loads changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how lateral loads drives the decision, and documents the recommendation in a review-ready sequence.

1. Work a structural design ii decision problem where system stiffness changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how system stiffness changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how system stiffness drives the decision, and documents the recommendation in a review-ready sequence.

1. Work a structural design ii decision problem where drift and serviceability changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how drift and serviceability changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how drift and serviceability drives the decision, and documents the recommendation in a review-ready sequence.

Chapter 4: Integrated structural design package

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1. Work a structural design ii decision problem where project framing changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how project framing changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how project framing drives the decision, and documents the recommendation in a review-ready sequence.

1. Work a structural design ii decision problem where system checks changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how system checks changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how system checks drives the decision, and documents the recommendation in a review-ready sequence.

1. Work a structural design ii decision problem where documentation and detailing changes the preferred option or the governing design check.

- Checkpoint answer: A strong checkpoint answer shows the governing criteria, explains how documentation and detailing changes the option screen, and lands on a defensible recommendation. - Solution note: A complete design response frames the criteria, shows how documentation and detailing drives the decision, and documents the recommendation in a review-ready sequence.

Homework answer key

Homework Set 1: System behavior and load path integration

1. Prepare a structural design ii design check or option screen focused on global load path. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through global load path, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on system idealization. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through system idealization, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on member interaction. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through member interaction, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on design assumptions. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through design assumptions, documents the governing check, and ends with a review-ready recommendation.

Homework Set 2: Connections, detailing, and constructability

1. Prepare a structural design ii design check or option screen focused on connection behavior. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through connection behavior, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on detailing choices. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through detailing choices, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on constructability. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through constructability, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on failure prevention. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through failure prevention, documents the governing check, and ends with a review-ready recommendation.

Homework Set 3: Lateral systems and service performance

1. Prepare a structural design ii design check or option screen focused on lateral loads. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through lateral loads, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on system stiffness. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through system stiffness, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on drift and serviceability. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through drift and serviceability, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on integrated performance review. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through integrated performance review, documents the governing check, and ends with a review-ready recommendation.

Homework Set 4: Integrated structural design package

1. Prepare a structural design ii design check or option screen focused on project framing. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through project framing, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on system checks. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through system checks, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on documentation and detailing. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through documentation and detailing, documents the governing check, and ends with a review-ready recommendation.

1. Prepare a structural design ii design check or option screen focused on review and revision. Show the governing criteria, tradeoffs, and the recommendation you would defend.

- Answer / solution summary: A strong submission frames the criteria, compares the relevant options through review and revision, documents the governing check, and ends with a review-ready recommendation.

Quiz answer key

Quiz 1: System behavior and load path integration

1. Which topic is explicitly central to System behavior and load path integration?

- Answer key: Global load path. Global load path is one of the direct topics named in System behavior and load path integration.

1. Before working forward in System behavior and load path integration, what should you identify first?

- Answer key: Accepted answer(s): criteria, constraints, tradeoffs, recommendation. High-quality work in System behavior and load path integration starts by identifying criteria, constraints, tradeoffs, recommendation, not by jumping directly into the middle of the method.

1. Which deliverable belongs to System behavior and load path integration?

- Answer key: System worksheet. System worksheet is a direct deliverable from System behavior and load path integration, so students are expected to complete it before moving on.

1. Name one direct topic from System behavior and load path integration.

- Answer key: Accepted answer(s): Global load path, System idealization, Member interaction, Design assumptions. Global load path, System idealization, Member interaction, Design assumptions are direct topics in System behavior and load path integration. A strong student should be able to name them without opening the notes.

Quiz 2: Connections, detailing, and constructability

1. Which topic is explicitly central to Connections, detailing, and constructability?

- Answer key: Connection behavior. Connection behavior is one of the direct topics named in Connections, detailing, and constructability.

1. Before working forward in Connections, detailing, and constructability, what should you identify first?

- Answer key: Accepted answer(s): criteria, constraints, tradeoffs, recommendation. High-quality work in Connections, detailing, and constructability starts by identifying criteria, constraints, tradeoffs, recommendation, not by jumping directly into the middle of the method.

1. Which deliverable belongs to Connections, detailing, and constructability?

- Answer key: Connection assignment. Connection assignment is a direct deliverable from Connections, detailing, and constructability, so students are expected to complete it before moving on.

1. Name one direct topic from Connections, detailing, and constructability.

- Answer key: Accepted answer(s): Connection behavior, Detailing choices, Constructability, Failure prevention. Connection behavior, Detailing choices, Constructability, Failure prevention are direct topics in Connections, detailing, and constructability. A strong student should be able to name them without opening the notes.

Quiz 3: Lateral systems and service performance

1. Which topic is explicitly central to Lateral systems and service performance?

- Answer key: Lateral loads. Lateral loads is one of the direct topics named in Lateral systems and service performance.

1. Before working forward in Lateral systems and service performance, what should you identify first?

- Answer key: Accepted answer(s): criteria, constraints, tradeoffs, recommendation. High-quality work in Lateral systems and service performance starts by identifying criteria, constraints, tradeoffs, recommendation, not by jumping directly into the middle of the method.

1. Which deliverable belongs to Lateral systems and service performance?

- Answer key: Lateral-system homework. Lateral-system homework is a direct deliverable from Lateral systems and service performance, so students are expected to complete it before moving on.

1. Name one direct topic from Lateral systems and service performance.

- Answer key: Accepted answer(s): Lateral loads, System stiffness, Drift and serviceability, Integrated performance review. Lateral loads, System stiffness, Drift and serviceability, Integrated performance review are direct topics in Lateral systems and service performance. A strong student should be able to name them without opening the notes.

Quiz 4: Integrated structural design package

1. Which topic is explicitly central to Integrated structural design package?

- Answer key: Project framing. Project framing is one of the direct topics named in Integrated structural design package.

1. Before working forward in Integrated structural design package, what should you identify first?

- Answer key: Accepted answer(s): criteria, constraints, tradeoffs, recommendation. High-quality work in Integrated structural design package starts by identifying criteria, constraints, tradeoffs, recommendation, not by jumping directly into the middle of the method.

1. Which deliverable belongs to Integrated structural design package?

- Answer key: Design package. Design package is a direct deliverable from Integrated structural design package, so students are expected to complete it before moving on.

1. Name one direct topic from Integrated structural design package.

- Answer key: Accepted answer(s): Project framing, System checks, Documentation and detailing, Review and revision. Project framing, System checks, Documentation and detailing, Review and revision are direct topics in Integrated structural design package. A strong student should be able to name them without opening the notes.

Mastery exam solution outlines

Structural Design II cumulative mastery exam

1. Prepare a structural design ii design response that uses global load path to compare alternatives and defend a recommendation.

- What to show: Criteria and constraints; The governing design check or comparison; A recommendation that could survive review - Solution outline: State the criteria, limits, and design assumptions before comparing any options. Use global load path and system idealization to show what drives the recommendation. End with the selected direction and a short defense of why it is the strongest option.

1. Prepare a structural design ii design response that uses connection behavior to compare alternatives and defend a recommendation.

- What to show: Criteria and constraints; The governing design check or comparison; A recommendation that could survive review - Solution outline: State the criteria, limits, and design assumptions before comparing any options. Use connection behavior and detailing choices to show what drives the recommendation. End with the selected direction and a short defense of why it is the strongest option.

1. Prepare a structural design ii design response that uses lateral loads to compare alternatives and defend a recommendation.

- What to show: Criteria and constraints; The governing design check or comparison; A recommendation that could survive review - Solution outline: State the criteria, limits, and design assumptions before comparing any options. Use lateral loads and system stiffness to show what drives the recommendation. End with the selected direction and a short defense of why it is the strongest option.

1. Prepare a structural design ii design response that uses project framing to compare alternatives and defend a recommendation.

- What to show: Criteria and constraints; The governing design check or comparison; A recommendation that could survive review - Solution outline: State the criteria, limits, and design assumptions before comparing any options. Use project framing and system checks to show what drives the recommendation. End with the selected direction and a short defense of why it is the strongest option.

1. Write a cumulative structural design ii response that explains what high-quality work looks like from setup to final defense in this course.

- What to show: A staged workflow from the opening setup to the final conclusion; The assumptions or judgment points that control course-level work; A clear statement of what mastery looks like in practice - Solution outline: Use the course outcome "Interpret structural systems through coordinated load-path and performance reasoning." as the anchor for the response. Show how criteria, constraints, tradeoffs, recommendation appear in a disciplined course-level workflow. End by explaining what would make a submission reviewable, defensible, and ready to earn full credit.

Reference note

For the full bibliography behind this textbook, use @@TOKEN_0@@. The answer key in this book is Summit-authored and aligned to the live course runtime.