TECHNICAL WRITING *for* STRUCTURAL ENGINEERING

A 20-Hour Course

TEACHER'S GUIDE

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Technical Writing for Structural Engineering

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Introduction

This Teacher's Guide supports instructors delivering *Technical Writing for Structural Engineering*, a ten-week practical course of 20 hours' duration designed for postgraduate students in structural engineering. The course provides a focused and practical introduction to professional technical communication. It emphasizes the creation of clear, accurate, and defensible documents essential for professional practice, including structural design reports, specifications, and other critical project documentation. Ethical communication, data validation, and effective use of visuals are central to the course, ensuring that all professional deliverables are transparent, verifiable, and professionally defensible.

This guide is intended for instructors who may not have a background in engineering. It provides explicit lesson plans, model examples, and detailed teaching notes so that each session can be delivered confidently and consistently. The teacher's primary role is not to teach engineering content, but to guide students in communicating technical information clearly, logically, and ethically.

Each week builds progressively from core principles of professional writing toward the production of a complete structural design report and oral presentation. The approach is interactive and workshop-based. Students learn through analysis of model documents, guided writing practice, peer review, and reflection. Teachers support these activities by highlighting aspects such as structure, clarity, objectivity, tone, and defensibility.

The course emphasizes three core professional principles: clarity, accuracy, and ethics. Students are taught to verify data, document assumptions, and ensure all writing is transparent and defensible. Teachers should consistently reinforce these principles in every activity, helping students recognize that professional writing is both a technical and ethical responsibility.

Upon successful completion of the course, students will be able to:

- Compose and design comprehensive professional documents, including structural design reports and specifications, that adhere to industry standards and professional expectations.
- Apply ethical principles to communication and data, ensuring that all professional documents are accurate, transparent, and defensible.
- Integrate clear and effective visuals, such as drawings, diagrams, and tables, into technical documents to enhance clarity and impact.
- Present technical information effectively to professional audiences, delivering persuasive presentations that communicate structural designs or project outcomes clearly to both technical and non-technical stakeholders.

Because this course is taught to postgraduate students, many of whom already possess strong technical knowledge, the teacher's role is to help them express that expertise effectively in written

and spoken English. The emphasis is always on communication quality: students should be able to organize information clearly, explain reasoning concisely, and produce professional documentation that would stand up to scrutiny in the workplace.

The materials in this Teacher's Guide are self-contained. Instructors can follow the detailed lesson outlines and examples without needing to supplement content from external technical sources. This ensures that each teacher, regardless of subject background, can confidently facilitate high-quality professional communication training within a structured and supportive framework.

Week 1 – Foundations of Structural Engineering Communication

Learning Outcomes:

- Explain importance of clear, concise, defensible documentation
- Identify characteristics of professional structural engineering documents
- Apply ethical principles including verification and accurate reporting
- Produce short professional writing samples

0:00–0:15 – Warm-Up Discussion

Teacher:
Welcome to Technical Writing for Structural Engineering. Today we begin with a simple question: why do engineers need clear documentation?

Expected Student Responses: Safety, legal accountability, avoiding mistakes, professional reputation

Teacher:
Exactly. Every calculation, report, memo, or email you produce is part of a professional paper trail. Poor communication can lead to mistakes, unsafe structures, or legal issues. For today, focus on four keywords: **Accountability, Clarity, Transparency, Verification.** We will practice using these in all exercises.

Mini Prompt:

Think of a time unclear communication caused a problem. Share one example briefly. It can be from a project, study, or observation.

Teacher (if silence):

- If someone reports that 'loads seem fine' without documentation, what could go wrong?
- If you write 'AI says this is okay' without checking, why is that risky?

0:15–0:35 – Reading Activity 1: Vague vs. Defensible Statements

Teacher:
Now we analyze some emails and report excerpts. Work in pairs. Identify vague words or phrases and underline precise, defensible language.

Example Set 1:

Email A (vague):

The beams look fine. Loads seem standard. Not sure about cracks.

Email B (defensible):

The reinforced concrete beams were inspected for live and dead loads of 4 kPa and 2 kPa, based on occupancy assumptions. Material properties were verified using supplier certificates. Calculations were manually checked. All assumptions are documented.

Example Set 2:

Email C (vague):

The columns are probably okay. The foundation seems fine.

Email D (defensible):

The reinforced concrete columns were inspected and meet design specifications. The foundation was verified to carry expected loads. Supplier data and design drawings were reviewed and confirmed.

Student Task:

- Circle vague terms in A and C
- Underline precise, defensible language in B and D

Model Answers:

- Vague: *look fine, seem standard, not sure, probably, seems fine*
- Defensible: precise numerical values, verification, documented assumptions

Teacher:
Why is Email B safer than Email A? → Objective, verifiable, transparent
What could go wrong with Email C? → Risk of errors, misinterpretation, professional liability

Mini Writing Practice:

- Rewrite one vague sentence from each email
- **Model Answers:**
    - The beams were inspected and confirmed to meet load-bearing requirements.
    - The columns were verified against design specifications and load criteria.

0:35–1:00 – Sentence-Level Drills

Teacher:
Now we practice rewriting sentences clearly and defensibly. Work individually.

Sentences for Practice:

1. The foundation seems strong.
2. Minor cracks may not matter.
3. The roof load looks okay.
4. The beams probably meet the requirement.
5. Columns appear standard.
6. The beams probably meet the requirement.
7. Loads seem normal.
8. The design looks acceptable.

Model Answers:

1. The foundation was inspected and meets load-bearing requirements per design criteria.
2. Minor surface cracks were observed but do not compromise structural integrity.
3. Roof live and dead loads were calculated according to occupancy guidelines and verified.
4. Beams were measured and confirmed to meet load-bearing requirements according to calculations.
5. Column dimensions were verified against design specifications and load requirements.
6. The beams were measured and confirmed to meet load-bearing requirements according to calculations.
7. Live and dead loads were verified according to standard occupancy assumptions.
8. The design meets all verified structural and safety requirements.

Teacher Reminder: Every statement must be objective and supported by evidence. Avoid assumptions or general impressions.

1:00–1:25 – Paragraph-Level Exercises

Teacher:
Next, we move to paragraph-level writing. Read each paragraph. Identify vague language, then rewrite clearly and defensibly.

Paragraph 1 (vague):

The foundation is probably strong enough. There might be cracks. Loads seem normal.

Model Answer:

The foundation was inspected and confirmed to meet load-bearing requirements. Minor surface cracks were observed but do not affect performance. Load assumptions were verified with supplier data. Calculations were cross-checked manually.

Paragraph 2 (vague):

The beams look fine. The columns are okay. We think the roof load is fine. AI suggested numbers.

Model Answer:

Reinforced concrete beams and columns were inspected and meet design specifications. Roof live and dead loads were calculated according to standard occupancy guidelines. All data were checked against supplier documentation, and no assumptions were made without supporting evidence.

Student Task: Rewrite these paragraphs individually. Circulate, provide model answers.

Optional Extension: Create 2–3 alternative sentences for each paragraph focusing on verification and audience adaptation.

1:25–1:45 – Mini-Report Section Drafting

Teacher Instructions:
Students now practise drafting a short professional paragraph introducing a small project.

Scenario (provided to all students):

A pedestrian bridge connects two sides of a small river within a university campus.

Span: 8 m **Width:** 2 m

Main materials: Reinforced concrete beams and columns

Design loads: Live load = 4 kPa, Dead load = 2 kPa

Inspection observations: Minor surface cracks on several beams; no structural issues

Verification: Load assumptions checked against national standards; material certificates reviewed; calculations cross-checked manually.

Sample Model Paragraph (Teacher Reference and Student Model):

This project involves designing a pedestrian bridge across a small river on the university campus. Reinforced concrete beams and columns form the main structure. Live and dead loads were