

## Writing Plan Narrative, 2nd Edition

*Please retain section headers and prompts in your plan.*

### **Introductory Summary:**

*Briefly describe the reason(s) this unit (department, school, college) became involved in the WEC project, the key findings that resulted from the process of developing this plan, and the implementation activities that are proposed in this Writing Plan, with particular attention to the following questions: what is new in this 2nd edition of the Writing Plan? What, if any, key changes have been made to the 1st edition? What key implementation activities are proposed in this edition of the Writing Plan? (1 page maximum)*

MTH has a longstanding interest in developing writing and presentation skills and a tradition of pedagogical experimentation to support communication, understood broadly. Historically, specific classes have had particular emphasis on writing, including 281 and 153 (though see below for more on 153). In the past few years, individual faculty and teams of faculty have piloted diverse writing initiatives across various other levels of the curriculum (including the introductory sequence 111/112 and a 300-level Calderwood seminar). Right now, we find ourselves in a period of faculty turnover that made this an auspicious moment to take a bird's-eye view of the curriculum as a whole and how writing fits into the curriculum.

Our main findings in the first Writing Plan were:

- There are particular aspects of writing instruction where students and faculty perceptions do not align and that we would like to understand better.
- MTH 153 has been a cornerstone of writing for the majors, but has also lacked consistency of goal or instruction over the last few years.
- When analyzing curricular flow through the department, we identified possible curricular gaps in writing instruction—e.g. expecting skills from introductory classes to develop without in fact reinforcing them in intermediate courses.
- Many of us valued discussions about rubrics and grading more generally, and felt that these issues merit recurring conversations, especially as rubrics interface with equity as well as with “punitive” grading.
- Many of us felt we haven't had conversations about writing, including assignments that worked well, how to effectively teach writing, or how to identify the qualities of good writing, especially in a mathematical context.
- We discussed creativity in math and agreed this is a key ability that we want to nurture. Many of us also agreed that creativity feels particularly hard to teach.



The key accomplishment during this implementation cycle was to build significant support among faculty despite the challenges of a year in which instruction—and the personal and professional lives of both faculty and students—continued to be disrupted by COVID, hybrid learning and ongoing childcare cancellations. As a department, we did the following:

- submitted, reviewed, and approved writing goals;
- discussed the first assessment;
- participated in a department workshop about rubrics; and
- attended two meetings about writing criteria including one that addressed substantial revisions to our writing criteria.

Subcommittees also started preliminary work on:

- coordinating MTH 153, including the complex interrelations between mathematical content and writing skills; and
- producing curated resources to help students learn LaTeX, the mathematical word-processing software used essentially universally across mathematics and physics in order to create and incorporate formulae, mathematical diagrams, etc. into writing.

Through this preliminary work as well as our departmental discussions, we identified both overreach and gaps in our original analysis. This has led to the following plans for the upcoming implementation year, discussed further in later sections:

- Creating a condensed version of the writing criteria.
- Further work to coordinate and support MTH 153.
- Developing a curated set of LaTeX (and Overleaf) tutorials for students.
- Hold informal discussions about the transition from 153 to the 200-level courses.

### Section 1: DISCIPLINE-SPECIFIC WRITING CHARACTERISTICS

*What characterizes academic and professional communication in this discipline?*

- ~~There have not been substantial revisions to this section of the Writing Plan.~~
- *There have been substantial revisions to this section of the Writing Plan. (Discuss these explicitly.)*

### Section 2: DESIRED WRITING ABILITIES

*With which writing abilities should students in this unit's major(s) graduate?*

- ~~There have not been substantial revisions to this section of the Writing Plan.~~



- *There have been substantial revisions to this section of the Writing Plan. (Discuss these explicitly.)*

**Section 3: INTEGRATION OF WRITING INTO UNIT’S UNDERGRADUATE CURRICULUM**

*How is writing instruction currently positioned in this unit’s undergraduate curriculum (or curricula)? What, if any, course sequencing issues impede an intentional integration of relevant, developmentally appropriate writing instruction?*

- ~~*There have not been substantial revisions to this section of the Writing Plan.*~~
- *There have been substantial revisions to this section of the Writing Plan. (Discuss these explicitly.)*

**Section 4: ASSESSMENT OF STUDENT WRITING**

*What concerns, if any, have unit faculty and undergraduate students voiced about grading practices? Please include a menu of criteria extrapolated from the list of Desired Writing Abilities provided in Section 2 of this plan. (This menu can be offered to faculty/instructors for selective adaptation and will function as a starting point in the WEC’s longitudinal rating process.).*

- *There have not been substantial revisions to this section of the Writing Plan.*
- ~~*There have been substantial revisions to this section of the Writing Plan. (Discuss these explicitly.)*~~

We significantly revised the list of writing criteria for the department but not the desired writing abilities. We found the abbreviated list of criteria much more useful (and hope that future assessment teams will, as well).

**Department of Mathematics Rating Criteria, 2021-22**

#	Criteria: The text...
1	<p><b>Demonstrates facility with technical writing (including for proofs and calculations) CRITERIA:</b></p> <ul style="list-style-type: none"> <li>● <i>Clearly establishes notation prior to use (including established notation, e.g. for sets or functions), uses notation consistently, and distinguishes among mathematical objects accurately (both in fact and in notation)</i></li> <li>● <i>Uses paragraph breaks, formatting, figures, sections, and other devices to break text into readable piece</i></li> <li>● <i>Cite sources unambiguously, whether cross-referencing theorems and sections or citing external sources, so that reader can identify and find reference</i></li> <li>● <i>Supports arguments and illuminates intuition with graphs, data, schematics and other visualizations, with axes and scale chosen to highlight key features</i></li> </ul>



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	<ul style="list-style-type: none"> <li>● <i>Uses complete sentences as well as correct grammar and punctuation, incorporating mathematical notation appropriately</i></li> </ul>
<b>2</b>	<p><b>Uses deductive reasoning explicitly and appropriately. CRITERIA:</b></p> <ul style="list-style-type: none"> <li>● <i>Moves from hypothesis to conclusion using steps that are explicitly and sequentially described</i></li> <li>● <i>Appropriately uses conditionals, if-and-only-if, exclusive and inclusive or, other logical components and proof techniques, and identifying if hypotheses are met when using a result</i></li> </ul>
<b>3</b>	<p><b>Writes clearly and coherently by writing concisely, communicating intuition, and highlighting central ideas. CRITERIA:</b></p> <ul style="list-style-type: none"> <li>● <i>Clearly emphasizes main points using topic sentences while avoiding repetition, auxiliary verbs, and passive voice, except when employed intentionally</i></li> <li>● <i>Provides motivation for the work, signposts throughout, and clearly notes the end of the work with concluding remarks (both for individual proofs and for the writing as a whole)</i></li> </ul>
<b>4</b>	<p><b>Demonstrates creativity. CRITERION:</b></p> <ul style="list-style-type: none"> <li>● <i>Contains questions and conjectures, observes patterns from evidence or examples, notes when results can be extended, provides solutions using multiple approaches (e.g. algebraic, geometric, using a model, using approximations) such that reader sees the student pressing at the boundaries of what they know.</i></li> </ul>
<b>5</b>	<p><b>Writes in their own style, deploying their own communication strengths and voice. CRITERION:</b></p> <ul style="list-style-type: none"> <li>● <i>Displays a clear and individual voice that is consistent throughout the work.</i></li> </ul>
<b>6</b>	<p><b>Contextualizes mathematical results, synthesizing ideas from various sources. CRITERIA:</b></p> <ul style="list-style-type: none"> <li>● <i>Identifies why results are important using connections to other ideas, texts, and courses.</i></li> <li>● <i>Uses schematics, graphics, metaphors, remarks, examples, and other tools to express the core ideas of an argument. illustrate applications, and point out the aesthetic value of the result.</i></li> </ul>
<b>7</b>	<p><b>Demonstrates audience awareness and appreciates difference in writing genres and purposes. CRITERIA:</b></p> <ul style="list-style-type: none"> <li>● <i>Identifies a consistent target audience and goal, either implicitly or explicitly, and uses technical notation, verbal descriptions, level of formality, and genre consistent with this target audience</i></li> <li>● <i>For collaborative writing: merges pieces from multiple contributors to form a unified whole</i></li> </ul>

In addition, we had a WEC-sponsored faculty workshop on using rubrics for grading. In part because of this workshop, we plan to create targeted versions of this list of criteria for faculty and student use (see below).

Moreover, as individual and small groups of faculty, we have experimented with variations of ungrading. As faculty with a tendency towards the quantitative, some of us have found this



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particularly useful when teaching writing, as it helps us distinguish between formative and summative assessments of student writing.

### Section 5: SUMMARY OF IMPLEMENTATION PLANS, including REQUESTED SUPPORT and RELATION TO PREVIOUS IMPLEMENTATION ACTIVITIES

*What does the unit plan to implement during the period covered by this plan? What forms of instructional support does this unit request to help implement proposed changes? What are the expected outcomes of named support?*

- **Creating a condensed version of the writing criteria.** One takeaway from the first assessment is that our writing criteria were unwieldy. After simplifying them in the last plan year, we realized how useful these criteria were, both for faculty and for students. **Action step:** In this plan year, we intend to work with Sara Eddy to create and distribute additional versions for specific audiences within the department.
- **Further work to coordinate and support MTH 153.** We found a number of obstacles in the way of coordination and alignment of course goals across sections of MTH 153, from the mundane (TuTh classes have fewer contact hours than MWF classes, how/whether to use LaTeX or online homework systems for computational aspects of the class) to the profound (how to prioritize different choices of content, working with the wide range of instructor experiences and aptitudes, mitigating the impacts of staffing and enrollment on effective student writing instruction, ensuring adequate student and instructor support despite our limited resources). We intend to focus on the following questions in the upcoming plan year.
  - MTH 153 typically incorporates writing instruction via in-class writing workshops. The time constraints of Tuesday/Thursday sections can make this challenging, if not impossible. This year, we plan to explore incorporating more peer review into assignments to improve students' writing, increase pace of improvement, and help instructors focus on students who need extensive support. **Action step:** we will advertise Peter Sapira's TAL on peer review and at least one member of the 153 group will attend and bring discussion points to the subcommittee.
  - Many of the instructors found it would be useful to have more resources to guide in various aspects of writing, including how to work in groups, suggestions for language to use in workshops and peer review, how to prepare for workshops, as well as the perennial writing issues that new math-writers encounter. One goal might be to create specific written guidance and/or audio/video clips that could be stored in a central repository and distributed to students periodically through the semester. **Action step:** if staffing is regularized, we may be able to produce some draft materials in the spring. However, multiple last-minute teaching



reassignments and overload teaching assignments in 153 this fall mean this is on hold for now.

- We plan to explore the benefits and barriers-to-implementation of differentiated writing instruction. We can often identify students who are struggling fairly early, and students who struggle often have overlapping challenges in mathematics, writing, and student skills. If we could focus more instructor and tutor support on those students, we might see more substantial learning gains overall. **Action step:** Targeted discussion in 153 subcommittee with the goal of identifying at least 3 additional resources to enable this work. Examples include writing-specific resources (e.g. SDS writing tutors) as well as non-writing resources that could allow instructors to allocate their own time differently (e.g. hire student TAs to help administer and troubleshoot the online homework system)

In addition to continuing this work for the sake of MTH 153, we expect this work will develop resources useful in other parts of the department.

- **Developing a curated set of LaTeX (and Overleaf) tutorials for students.** One thing we were able to identify more clearly after the analysis of the previous implementation year is that good writing in mathematics requires students to gain a fair amount of facility with LaTeX, the preeminent word-processing software for writing mathematics. Indeed, Criterion 1 (in our revised list) is impossible in writing of length without LaTeX. There are many tutorials and webpages available to learn LaTeX. Our goal is to find a small and effective set to “jumpstart” our students’ learning. **Action step:** Our plan this year is to work with students to create video tutorials and to test-drive online resources, especially to ensure that the LaTeX guides we offer meet our students’ learning preferences and needs.
- **Host informal discussions about the transition from 153 to the 200-level courses.** All majors pass through at least one of 280, 281, 233, 238, which we view as the next tier of writing instruction after 153. **Action step:** In coordination with the 153 subcommittee, we plan to meet with instructors of these 200-level courses in order to explicitly identify realistic expectations about what students who have taken 153 should *know* versus *mastered* versus *encountered*.

## Section 6: PROCESS USED TO CREATE THIS WRITING PLAN

*How, and to what degree, were a substantial number of stakeholders in this unit (faculty members, instructors, affiliates, teaching assistants, undergraduates, others) engaged in providing, revising, and approving the content of this Writing Plan?*



## Smith College Writing-Enriched Curriculum Writing Plan Narrative, 2nd edition

All department members participating in our spring WEC meeting: endorsed the revised writing criteria and requested additional versions for specific audiences; endorsed further discussion of 153 in subcommittee (to which all current and recent 153 instructors are regularly invited and/or solicited for feedback); and requested a curated set of LaTeX (and Overleaf). This draft was sent to the department for comment and feedback when sent to the WEC committee.



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