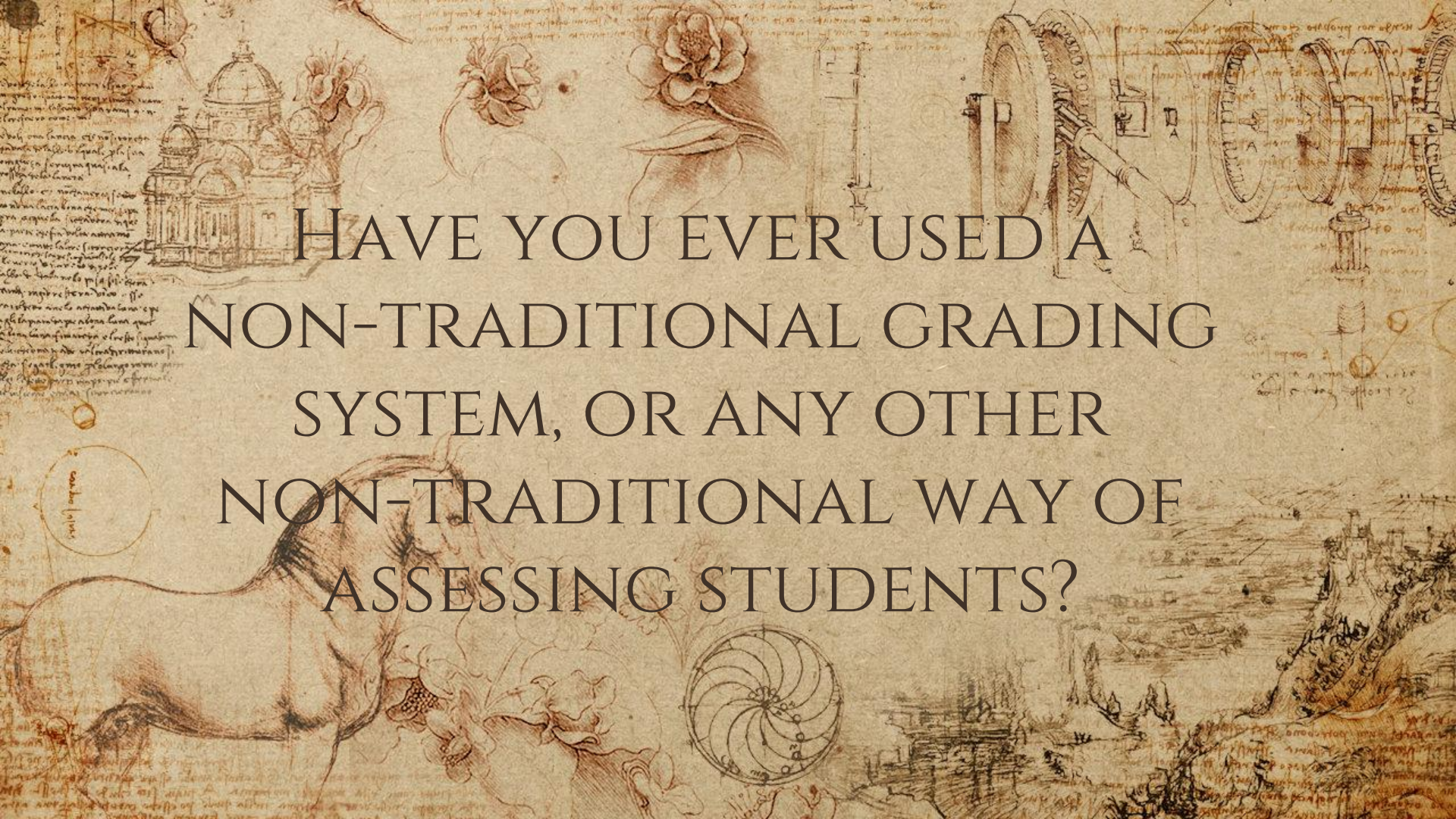


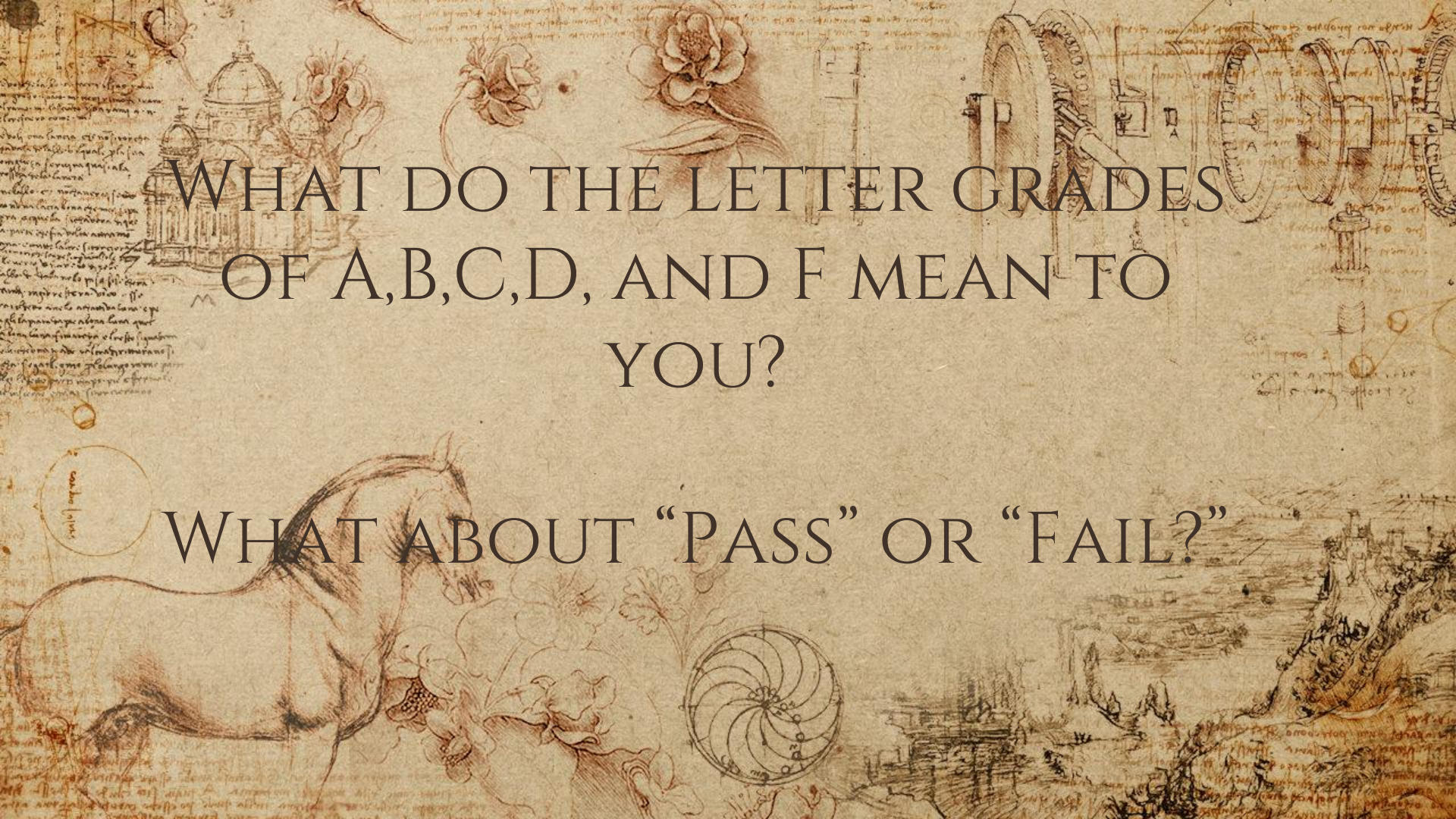
SPECIFICATIONS GRADING

FELICIA TABING



The background is a collage of Leonardo da Vinci's sketches. At the top left is a dome-shaped building. To its right are several flowers. In the top right corner, there are mechanical gears and a hand operating a lever. At the bottom left, a horse is shown in profile. In the bottom center, there is a circular diagram with spiral lines. The entire background is filled with faint sketches and handwritten text in a cursive script.

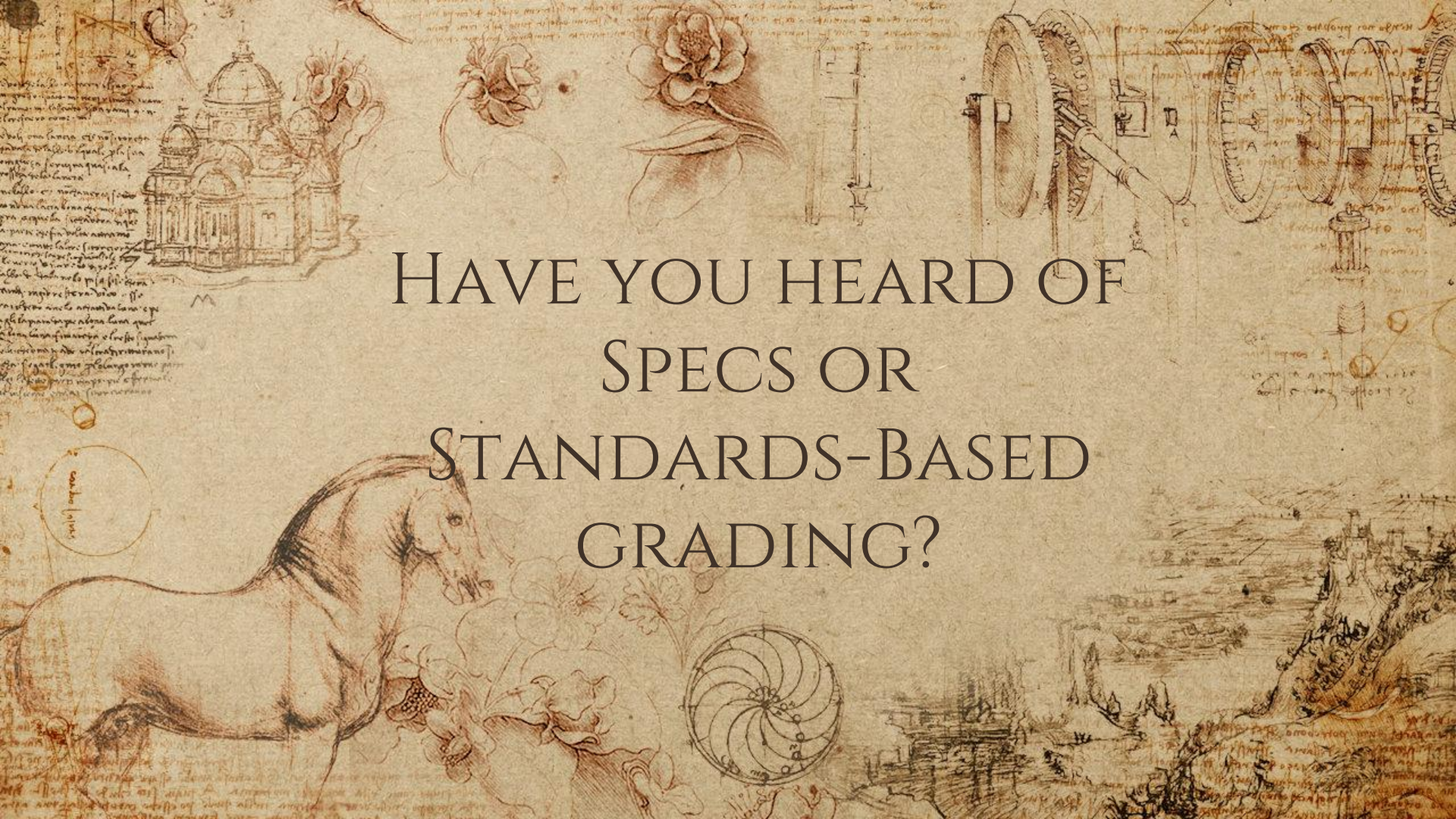
HAVE YOU EVER USED A
NON-TRADITIONAL GRADING
SYSTEM, OR ANY OTHER
NON-TRADITIONAL WAY OF
ASSESSING STUDENTS?

The background is a collage of Leonardo da Vinci's sketches. At the top left is a dome of a building. To its right are several flowers. Further right are mechanical gears and a pulley system. At the bottom left is a sketch of a horse's head and neck. In the bottom center is a circular diagram with spiral lines. The bottom right shows a landscape with a building and a hillside. The entire background is filled with faint, illegible handwritten text.

WHAT DO THE LETTER GRADES
OF A,B,C,D, AND F MEAN TO
YOU?

WHAT ABOUT "PASS" OR "FAIL?"

HAVE YOU HEARD OF
SPECS OR
STANDARDS-BASED
GRADING?



PREFACE

SPECIFICATIONS GRADING

*Restoring Rigor, Motivating Students,
and Saving Faculty Time*

Linda B. Nilson

FOREWORD BY CLAUDIA J. STANNY

The intended audiences for this book are all members of higher education who teach, whatever the discipline or rank, as well as those who oversee, train, and advise those who teach. The book offers a new paradigm that I call *specifications grading*, or *specs grading* for short. It gives faculty strategies for developing and grading assignments that reduce time and stress, shift responsibility to students to earn grades rather than “receive” them, reduce antagonism between the evaluator and the evaluated, and increase student receptivity to meaningful feedback, thus facilitating the learning process. It also helps instructors enhance their students’ motivation to do well, lower their stress and confusion over academic expectations, strengthen their work ethic, and ensure greater rigor in the educational enterprise. It may even restore some credibility to grades by demonstrating how they can reflect the learning outcomes students achieve. And it is completely within the discretion of the faculty.

GOALS OF SPECIFICATIONS GRADING:

- ❖ Motivate Student Learning
- ❖ Bring rigor and quality of student work up
- ❖ Lessen the grading load
- ❖ A letter grade of an “A” means it’s really exceptional, and a “C” means the student is pretty proficient still.
- ❖ Lessen student stress and cheating.



The background is a page from an antique manuscript, likely a technical or scientific treatise. It features dense, handwritten text in a cursive script, possibly from the 16th or 17th century. Several diagrams are scattered across the page, including a complex geometric diagram in the top left corner, a circular diagram with internal lines in the middle left, and a circular diagram with a shaded segment in the bottom right. The paper is aged and shows some staining and wear.

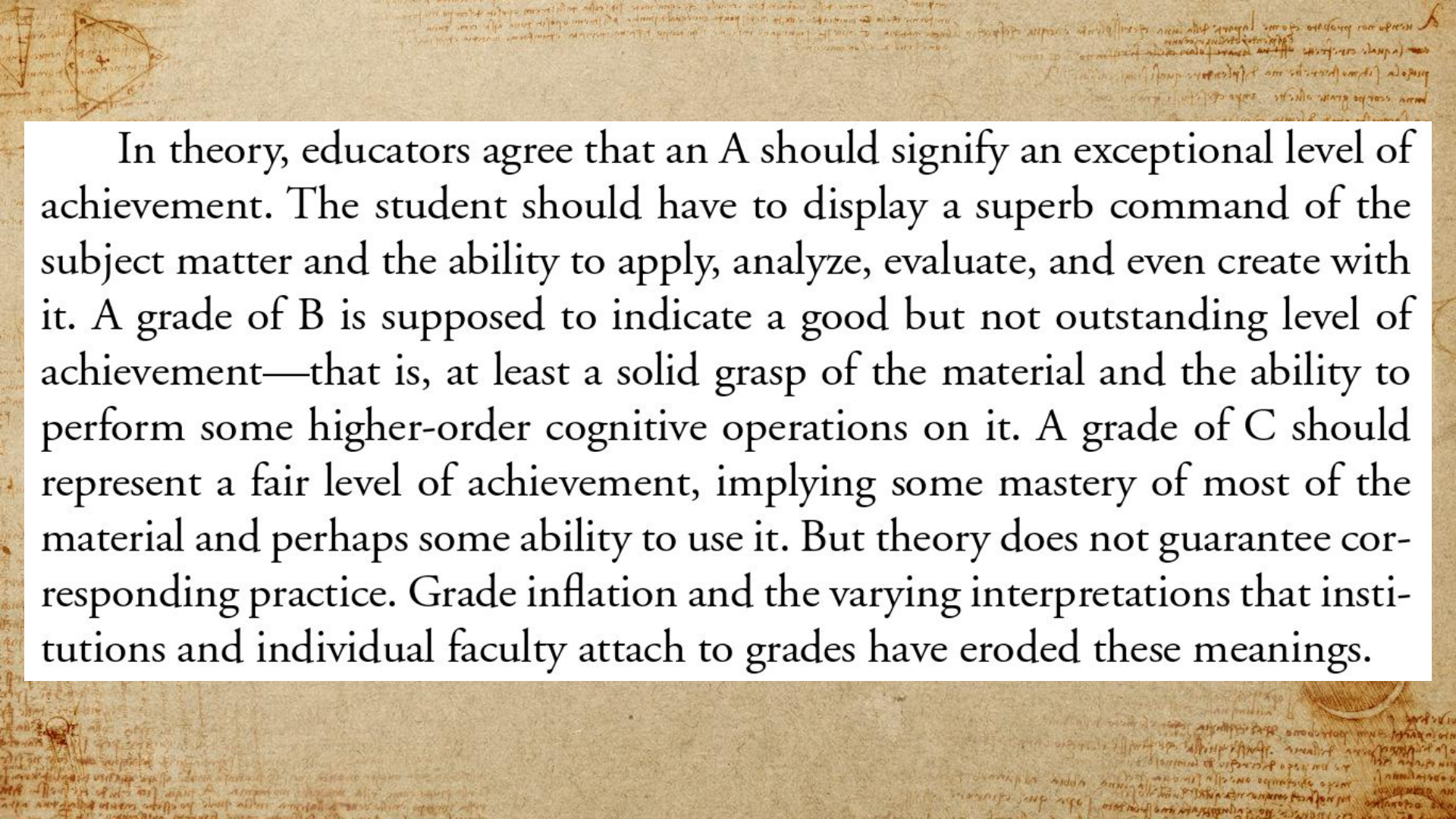
SPECIFICATIONS?

“Specifications” refers to the specified criteria that, if all area satisfied, work is considered “satisfactory” or a “pass.”



SPECIFICATIONS GRADING AND
CHANGING THE MEANING OF
LETTER GRADES

A letter grade of an “A” means it’s really exceptional, and a “C” means the student is pretty proficient still.

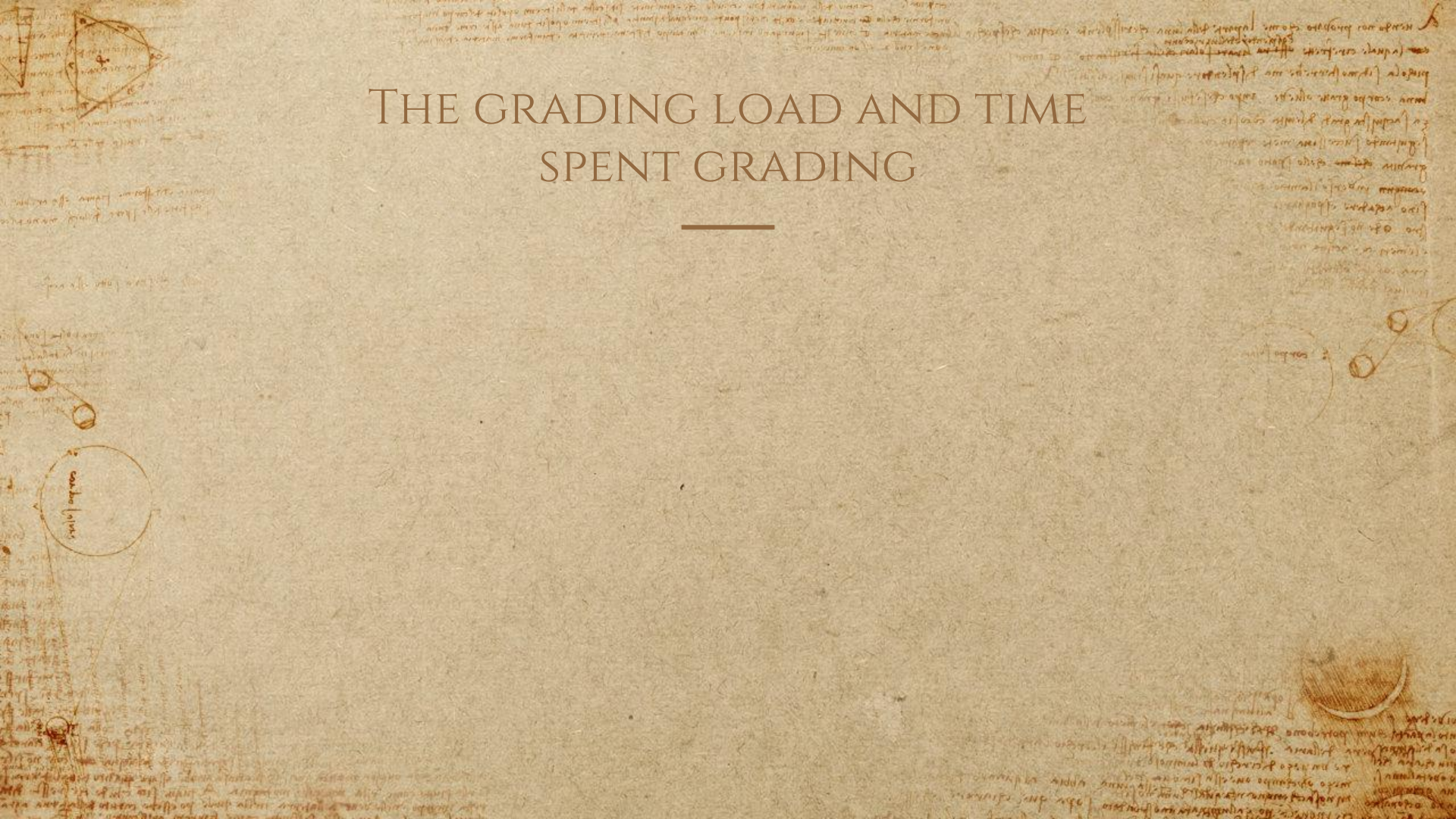
The background is a scan of an antique manuscript page. In the top left corner, there is a geometric diagram showing a circle with an inscribed polygon and various lines and points labeled with letters. The rest of the page is filled with faint, handwritten text in a historical script, likely Latin or Greek, which is mostly illegible due to fading and the texture of the paper. The text in the foreground is a modern, black, serif font overlaid on a white rectangular background.

In theory, educators agree that an A should signify an exceptional level of achievement. The student should have to display a superb command of the subject matter and the ability to apply, analyze, evaluate, and even create with it. A grade of B is supposed to indicate a good but not outstanding level of achievement—that is, at least a solid grasp of the material and the ability to perform some higher-order cognitive operations on it. A grade of C should represent a fair level of achievement, implying some mastery of most of the material and perhaps some ability to use it. But theory does not guarantee corresponding practice. Grade inflation and the varying interpretations that institutions and individual faculty attach to grades have eroded these meanings.

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Outcome assessment is even more tenuous at the course level, where grades and ultimately GPAs are determined. Grades do not directly assess whether or not students have attained outcome X or Y or Z. At best, they reflect the *degree* to which students have achieved the course outcomes *in general*. Has a student who earned an A in a course achieved *all* of the learning outcomes at an *exceptionally high* level of competency or merely at a *satisfactory* level? The majority of students getting a final grade of B, C, or D present even more ambiguous cases. Did they attain some of the outcomes at a satisfactory level and not others? Did they achieve a few at a high level of competency and others not at all? At what level did they achieve any of them? It is impossible to tell, and the syllabus probably does not translate course grades into demonstrated skills either. As a result, institutions must take the additional time-consuming steps to assess students' competencies at the program and curricular levels to meet accreditation and accountability

THE GRADING LOAD AND TIME SPENT GRADING



One such time-eater relates to partial credit. In the current grading system, instructors are expected to give partial credit for almost anything correct a student submits, including largely wrong or vague responses. Perhaps they fear that giving zeros for poor work might discourage students or lead to their failing more students (which administrators discourage); or maybe they are happy to get *any* work out of their students. In any case, determining how many points of the possible maximum to allocate to a given answer is never easy. In their effort to be fair, faculty often go back over assignments and tests they have already graded to find out how they scored a similar response. Then they feel obliged to justify whatever points they subtract by writing on the student's work what is inaccurate, illogical, or missing in the work or even reteaching the correct approach. When we multiply this effort by the number of test questions or writing assignments and the number of students in their classes, it becomes clear why so many faculty shy away from substantial

What the faculty reap for their endless hours of grading are more grading protests and conflicts with students than ever before. Of course, the reasons behind this student behavior lie largely in the values and beliefs of the Millennial generation and their parents, such as their customer attitude toward higher education, their distaste for academic learning and the life of the mind, their alienation from standard teaching methods, and their sense of entitlement to high grades in light of high tuition costs. Instructors who understand these motivations can use any of several methods to stem the nuisance complaints about grades (Nilson, 2010). But traditional grading, which is so reliant on partial credit and hair-splitting point allocation, actually encourages students with a Millennial mentality to fight for extra points whenever they see a possible opening. Naturally, they would not bother with this strategy if it did not work at least some of the time.

NILSON'S CRITERIA FOR EVALUATING GRADING SYSTEMS

1. Uphold high academic standards
 - Rigor is sacrificed to enhance student satisfaction.
2. Reflect Student Learning Outcomes
 - What do letter grades mean for students achieving certain learning outcomes?
3. Motivate students to learn.
 - Higher education right now is a game that students win when they get high grades for putting in the least amount of time and effort. **Learning emphasized over grades.**
4. Motivate students to excel
 - Partial credit discourages students from achieving excellence
 - Incentives for students to work hard and do their best

NILSON'S CRITERIA FOR EVALUATING GRADING SYSTEMS

5. Discourage cheating

- ❖ With little incentive to learn, students cheat
- ❖ Give students more choices to control their learning and assessment

6. Reduce student stress

- ❖ Give students more control over their education, and clearer expectations, because students feel like they lack control over their success

7. Make students feel responsible for their grades.

- ❖ If students know what they have to do for each grade, they are responsible for their grade

NILSON'S CRITERIA FOR EVALUATING GRADING SYSTEMS

8. Minimizing conflict between faculty and students

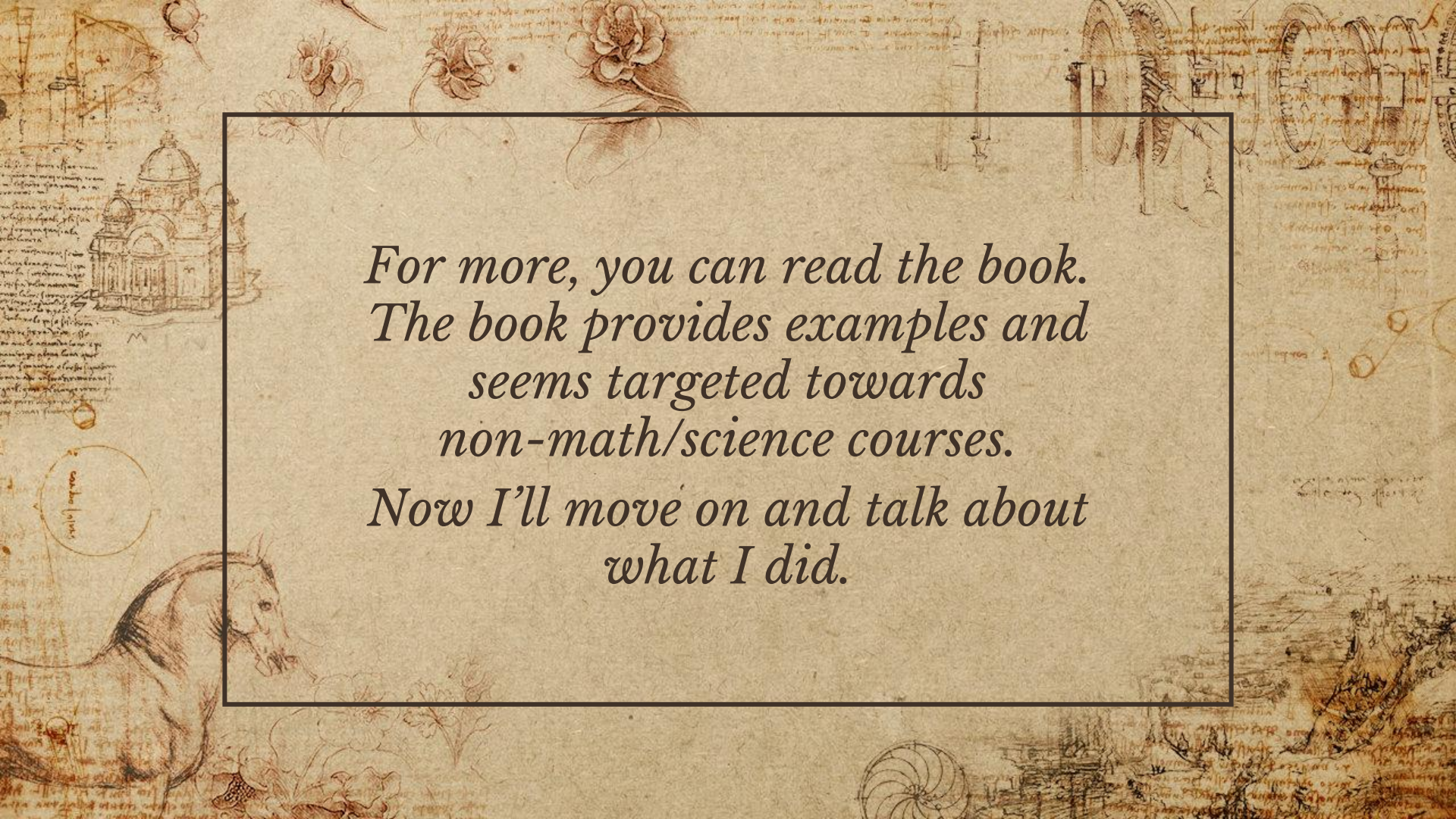
- ❖ Students protesting over their grades and squeezing out points.
- ❖ Better that students understand the work required for every assessment.
- ❖ To curb extension negotiation, a new system that incorporates positive incentives to plan ahead or submit work early or on time.

9. Save faculty time.

- ❖ No partial credit

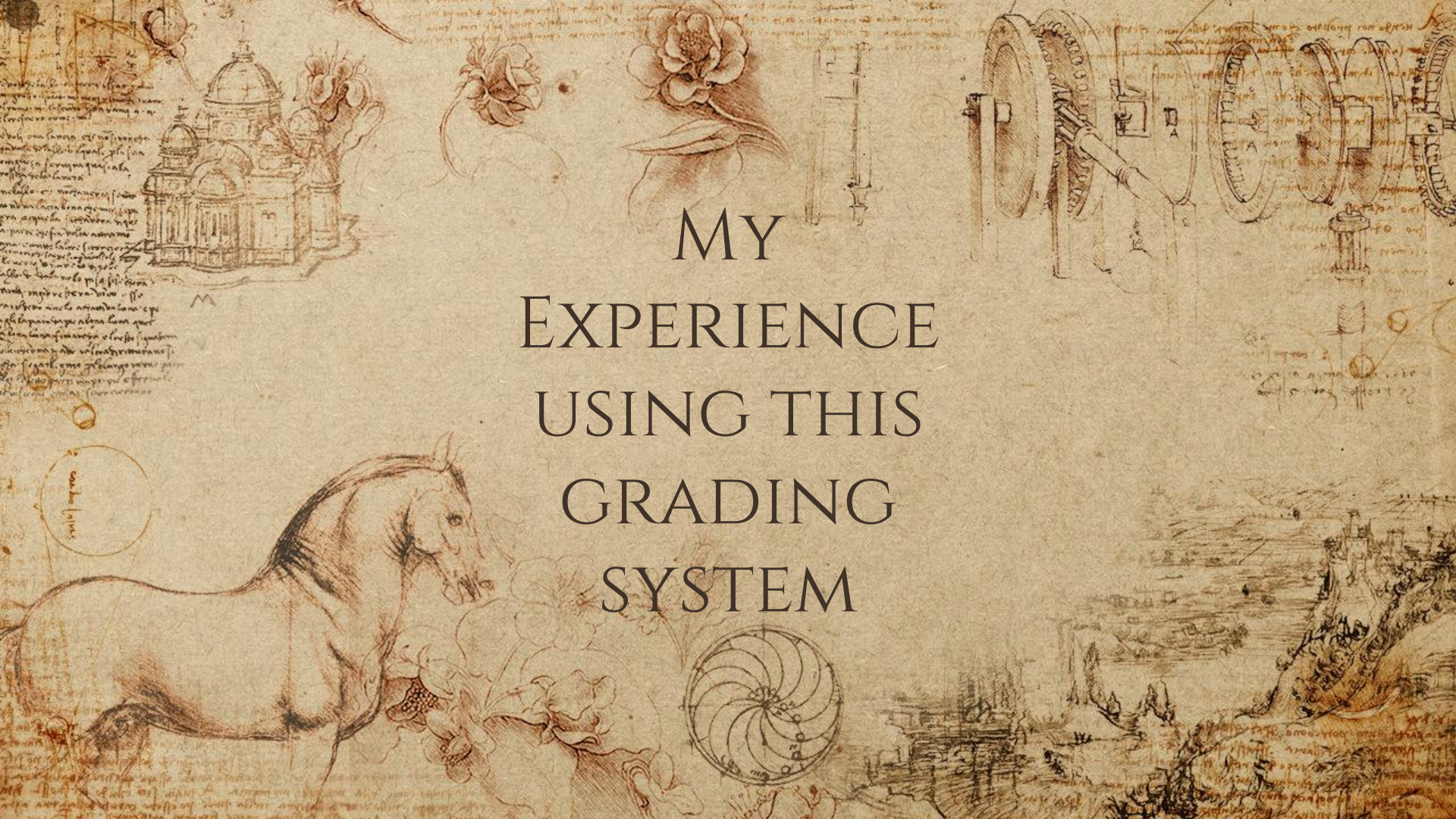
10. Give students feedback they will use

- ❖ Students view feedback as justifications for their grade, rather than constructive advice for improvement.



*For more, you can read the book.
The book provides examples and
seems targeted towards
non-math/science courses.
Now I'll move on and talk about
what I did.*

MY
EXPERIENCE
USING THIS
GRADING
SYSTEM



CAVEAT/CONTEXT:

- ❖ I used this system at a small engineering school (Rose-Hulman) with students that are exceptional and motivated to learn already.
- ❖ My classes were around 25-30 students.
- ❖ Rose-Hulman had an awesome testing center where I can send tests, and they handle all of the proctoring.

WHY

- ❖ In a teaching meeting with other math faculty at Rose-Hulman, two of my colleagues talked about specs grading. They explained it to me.
- ❖ I was dissatisfied with students begging for points, and the lack of motivation for learning.
- ❖ I also heard about this system from math education researchers.
- ❖ If people are doing this, especially math education people, shouldn't I try it?

HOW

- ❖ It was relatively easy for me to set up my system because two other math faculty at Rose used this system.
- ❖ One of my math colleagues at Rose helped run a workshop open to all Rose faculty for setting up the specs grading system.
- ❖ I obtained a few syllabi from my colleagues, so my syllabus was based on theirs.

MY SYLLABUS

I will go over the contents of my syllabus for a course I taught in my last quarter at Rose-Hulman called “Discrete and Combinatorial Algebra II.” This was the last iteration of a syllabus I used for specs grading, and had my last modifications. It also shows how I incorporated the common final.

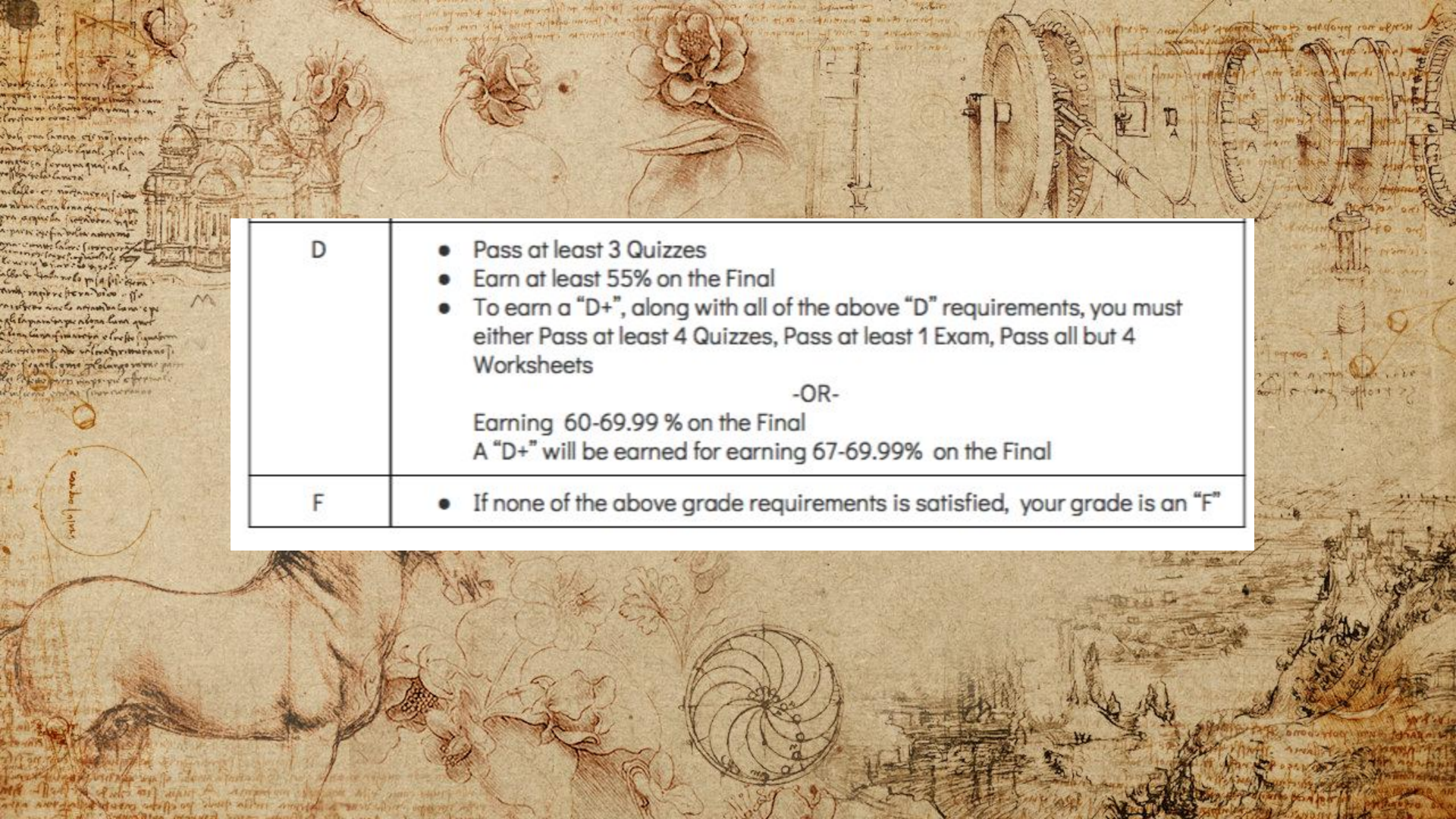
WARNING

This syllabus is a total of 15 pages.

- ❖ I e-mailed students before the class started, and told them to read the syllabus
- ❖ I didn't print the syllabus
- ❖ I put an “Easter egg” in the syllabus with an incentive

LETTER GRADE REQUIREMENTS:

Letter Grade	All of the listed requirements must be satisfied in order to achieve the respective letter grade
A	<ul style="list-style-type: none">● Pass all 3 Exams● Pass all 6 Quizzes● Pass all but 2 Worksheets● Earn at least 80% on the Final <p>-OR-</p> <p>Earning 90-100 % on the Final</p>
B	<ul style="list-style-type: none">● Pass at least 2 Exams● Pass at least 5 Quizzes● Pass all but 4 Worksheets● Earn at least 70% on the Final● To earn a "B+", along with all of the above "B" requirements, you must either pass 6 Quizzes, pass all 3 exams, or pass all the Worksheets. <p>-OR-</p> <p>Earning 80-89.99 % on the Final A "B+" will be earned for earning 87-89.99% on the Final</p>
C	<ul style="list-style-type: none">● Pass at least 1 Exam● Pass at least 4 Quizzes● Pass all but 6 Worksheets● Earn at least 60% on the Final● To earn a "C+", along with all of the above "C" requirements, you must either Pass 2 Exams, Pass at least 5 Quizzes, Pass all but 4 Worksheets <p>-OR-</p> <p>Earning 70-79.99 % on the Final A "C+" will be earned for earning 77-79.99% on the Final</p>



D	<ul style="list-style-type: none">● Pass at least 3 Quizzes● Earn at least 55% on the Final● To earn a "D+", along with all of the above "D" requirements, you must either Pass at least 4 Quizzes, Pass at least 1 Exam, Pass all but 4 Worksheets <p style="text-align: center;">-OR-</p> <p>Earning 60-69.99 % on the Final A "D+" will be earned for earning 67-69.99% on the Final</p>
F	<ul style="list-style-type: none">● If none of the above grade requirements is satisfied, your grade is an "F"

GRADING COMPONENTS

WORKSHEETS:

Worksheets will be announced and handed out in class and posted Moodle. **You will be assessed pass/no pass grade on on worksheets.** For worksheets, I expect work to be neatly written, with problems presented in a logical manner. Clearly circle or highlight your answers. If you got help from someone or from a source online, include the source by your work. Multiple pages should be fastened in some way, preferably with a staple, or I may reject it with a No Pass. Late Homework and Worksheets will be accepted at the cost of tokens. Late homework will be accepted at the cost of 1 token for every day that it is late. To be considered on time, worksheets must be submitted by 4:20 p.m. on the due date.

GRADING COMPONENTS

QUIZZES:

Expect a half-hour quiz about every week that there is no exam. **Quizzes will be graded pass/progressing/no pass.** They are no notes/closed book unless I mention otherwise. If you received a Progressing grade on a quiz, you may earn a Pass by submitting a redo before the announced deadline (usually three days after the quiz was graded and returned) for redos and at the cost of a token. If you earned a No Pass grade on a quiz, you will have the opportunity to take a new quiz in the Testing Center at the cost of two tokens. This new redo quiz will also be graded pass/progressing/no pass, and the same rules apply. Quiz makeups will only be provided for absences with valid excuses.

GRADING COMPONENTS

- ❖ In Calc II, I experimented with not having exams, and only using quizzes.

EXAMS:

There will be **three** cumulative exams. **Exams will be graded pass/progressing/no pass.** The same redo policies for quizzes apply for exams. I may or may not let you have a page of notes for the exams. Exam redos will only be provided for absences with valid excuses.

GRADING COMPONENTS

- ❖ Because the final was a common final with other sections of this course, this was the only thing in the course graded with points.
- ❖ I ended up doing this for courses that I was the sole instructor for.

FINAL:

The final exam is cumulative and covers everything you will learn in this course. No books or notes will be allowed on the final. The final exam will be assessed with a percentage grade.

INCENTIVE FOR TURNING THINGS IN ON TIME: "TOKENS"

Token System:

You will be given 3 "tokens" at the start of the course.

Tokens can be spent on any of the following:

- A one-day extension of the deadline of a Worksheet, or Quiz Redo. The number of days an assignment is late will cost that many tokens to get your assignment graded (1 token)
- A redo of a Worksheet or Quiz Redo costs one token. (1 token)
- A new Quiz/Exam to redo a Quiz/Exam with a No Pass costs two tokens. (2 tokens)
- Any leftover tokens at the end of the course can be applied to lower the threshold of the percentage of the Final grade you need to earn for a given letter grade. Each token will be worth 1/4rd of 1 percentage point. For example, if you are aiming for an A, and you have four leftover tokens, the Final percentage you need to earn to earn an A is 79%.
- If you see this note, e-mail Dr. Tabing your favorite number and the location of this sentence for one token.

You will also be given opportunities to earn tokens, such as:

- Turning in a worksheet at least 24 hours before the stated due date. (1 token)
- A small problems or assignments that may be assigned.
- If you need more tokens, just ask me and we can make a deal.

If you do not have enough tokens to turn in a late assignment or a redo, I have the right to refuse to accept it and grade it. Tokens may not be traded, sold, or transferred in any way between students.

WHAT MY GRADING SYSTEM DID DO:

- ❖ Lessened student stress
 - My students told me that it made them less stressed.
 - A student had a visitor sit in on my class, and he was telling the visitor about the grading system and how nice it is that they have redos.
- ❖ Students felt responsible for their grades
 - I didn't get one complaint about grades. Students that got low grades knew it was their fault.
- ❖ Motivated student learning
 - Students didn't ask for points, or begged for points anymore; they came to my office and asked me how to do the problem

Specifications for Class Work

Here we list the criteria that needs to be met for your course work that is graded pass/progressing/no pass. On your work and in the gradebook, a Pass is denoted by 1, a Progressing denoted by 0.5, and a No Pass is denoted by a 0.

Types of mistakes: Here, I'll define what I mean by a minor or major mistake, and an honest attempt.

Minor Mistake: A mistake that doesn't indicate a lack of understanding of the material. This is a mistake that is a result from a "typo," or from working through a calculation quickly. For example, an arithmetic error that does not lead to an obviously false answer.

Major Mistake: A mistake that reveals a lack of understanding of either the material, the logic or vocabulary to clearly explain the answer, or prerequisite material for this course. Incorrect or poorly explained logical reasoning is a major mistake. For example, using the wrong formula or technique, or an arithmetic error that leads to an obviously false answer (e.g. negative volume) is a major mistake.

Honest Attempt: An honest attempt is made when a problem was thoughtfully attempted, and all work is shown for this attempt. Writing down a random answer, copying, or guessing are not considered honest attempts.



The background is a textured, aged parchment or paper with faint, handwritten text in a historical script. There are several diagrams: a complex geometric diagram in the top left, a circular diagram with a vertical line in the middle left, and a circular diagram with a shaded segment in the bottom right. A horizontal line is positioned below the title.

MASTERY OF TOPICS

My grading system emphasized mastery of topics rather than learning objectives.

MA375 LIST OF TOPICS

6.1 Languages

- Know all of the important definitions
- Know how to compute powers of an alphabet, language, and words, how to concatenate words, counting words of certain lengths, counting prefixes/suffixes/subwords...
- Know how to prove different properties of language concatenation and intersection (the theorems listed in the "Language" notes.)

6.2 Finite State Machines: A First Encounter:

- Know the definition of a finite state machine.
- Know how to draw a state diagram or write the state table for a finite state machine.
- Know how to construct a finite state machine that can do simple actions

6.3 Finite State Machines: A Second Encounter

- Know how to construct a sequence recognizer machine and k-unit delay machine in different situations.

7.1 Relations Revisited: Properties of Relations

- Know the important definitions.
- Be able to construct and determine relations that are reflexive, symmetric, antisymmetric, and transitive, and also count such relations.
- Know the definition of a partial order.

7.2 Computer Recognition: Zero-One Matrices and Directed Graphs

- Know important definitions and graph theory definitions
- Know how to compose two relations, and take powers of a relation.
- Be able to prove simply properties of compositions of relations.
- Be able to write the zero-one matrix for a relation, and given a relation, be able to write its zero-one

WHAT MY GRADING SYSTEM DID DO:

- ❖ Lessened grading load
 - ❑ In some ways, I did feel like grading was faster in that I didn't have to think about point allocation.
 - ❑ I gave work back faster, because grading was fast
- ❖ Students in control of their learning/motivate students to excel
 - ❑ I gave students choices of projects they can do to earn an A or a B.
- ❖ Uphold high academic standards
 - ❑ I valued rigor in this system. Their problem was right or wrong. Even if it was “mostly right,” it was given a 0 if there was something not perfect.
- ❖ Give students feedback they will use
 - ❑ Maybe. I wrote hardly any feedback. If they got a problem wrong, I vaguely circled what was wrong, and that was it. They had to figure out what was wrong.

WHAT MY GRADING SYSTEM DIDN'T DO

- ❖ **Lessen grading load**
 - ❑ I never actually measured it, but the time I saved from pass/no pass grading might have contributed to more grading because of the volume of redos I graded.
- ❖ **Reflect on student outcomes**
 - ❑ Because students had to pass a certain number of quizzes and exams, rather than specific outcomes, the letter grade is not closely associated with which outcomes were achieved.
 - ❑ I also didn't label each quiz by which outcomes I'm testing them on.
- ❖ **Discourage cheating**
 - ❑ Because it lessened the stress on students, I do feel like there was probably less cheating. But what makes me unsure is that in my last quarter at Rose, I reported 5 or more students for cheating on the final. But maybe it's because the final is "final." I did catch one or two cheating on midterms.

DISADVANTAGES TO SETTING THE GRADING SYSTEM UP

- ❖ Need to set up the system before the course starts. I can't really change much along the way.
- ❖ I think this is very hard to do if you don't know much of what is covered in the course. (I used this for my probability course in the Spring quarter, and I have never learned probability before)

RESULTS

- ❖ I compared the percentage of letter grades I gave the previous year for the same classes with the points-based system, and I gave roughly the same distribution of letter grades.
- ❖ Quality of work did seem better.
- ❖ I really do think that my students learned more.
- ❖ I can't tell if it was a result of me gaining more teaching experience, but I really do feel like the classroom learning environment was more conducive to learning and making mistakes.

ASPECTS OF THE GRADING SYSTEM I AM CURRENTLY USING.

- ❖ Pretty much the only place I actually am using any part of this is that the worksheets in discussion in my 118 and 114 class are graded on a scale of 0,1,2. Although, the meaning is different. They get a 0 if they are absent, a 1 if they are really late, work alone rather than in a group, or did not put effort into trying the worksheet, and a 2 if they worked in a group and made a decent attempt at the problems.
 - The thing is, I don't allow redos, I just drop the lowest two.
- ❖ In 114, for the first exam, I am allowing them to redo part of the exam, but with restrictions. To save grading time, I am restricting it to three problems they are allowed to redo, and they can only redo 2, and they have to “submit” corrections by presenting the solution to me in my office. If
 - If I had more time, less students, and a TA that had more time, I would probably allow them to redo the whole exam, or write a new one that they can redo.

WOULD I DO THIS AGAIN?

- ❖ Yes, if I were allowed to
- ❖ Definitely if I had classes with less than 30 students.
- ❖ I really want to because I am curious about how this system will work with non-engineering students.

WHAT I WOULD CHANGE THE NEXT TIME I USE THIS SYSTEM

- ❖ Broaden the learning objectives
- ❖ Change the grading system so that letter grades reflect broader learning objectives
- ❖ Possible get rid of tokens
- ❖ In specifications for class work, I would provide actual examples of the different levels of work.
- ❖ Rename “list of topics” to “learning goals,” which I’m doing in my classes now.

REFERENCES



Nilson, L. (2015). *Specifications grading : restoring rigor, motivating students, and saving faculty time*.

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<https://www.insidehighered.com/views/2016/01/19/new-ways-grade-more-effectively-essay>



THANK YOU!