Comprehensive Projects Evaluation Standards

Your comprehensive project will consist of a formal written paper and a 20-25 minute oral presentation. It will be evaluated on

1. the substance and quality of the *content* of the overall project,
2. the quality of the oral presentation,
3. the quality of the formal written paper, and
4. the evidence of intellectual/academic growth in the process of completing this project.

While points 2 and 3 above are explicitly part of your Math 400 grade, points 1 and 4 above are implicit parts of the overall evaluation of the paper and the presentation. As a guide to the evaluation of the comprehensive projects, we give the following rubric.

You will earn an **A** if your work, on the whole, meets the following criteria. In particular, to earn an A, your work *must* meet the content description listed in this section.

- **Content**. The project (as presented through your written paper and oral presentation) demonstrates a clear and in-depth understanding of some area of mathematics which goes beyond your previous experiences in mathematics.
  - Your work is focused. In other words, the purpose and central concept(s) of your project are solidly established and you do not deviate unnecessarily from these concepts.
  - Your work shows depth. In other words, you show a deep understanding of at least one important area of mathematics rather than showing relatively shallow or limited understanding about a broad array of concepts.
  - Your work is mathematically accurate.
  - There is clear and logical development of the mathematics.
  - The content area represents, to some degree, "new" mathematics (or a new look at "old" mathematics) for you.
  - Your work demonstrates your own understanding of important concept(s). Your project must be your own presentation of your own understanding of the material, and not simply a (non-plagiarized) paraphrasing of your sources. You demonstrate a certain level of command of the topics.
  - You clearly and fully support all of your work with good examples and/or well-reasoned arguments or proofs.
  - You appropriately and fully use available resources (texts, articles, faculty, peers, other). Each faculty mentor will provide feedback as to the students' use of the faculty member as a resource. Note that it is not the number of resources utilized that will be judged, but rather the student made an effort to locate resources, particularly those suggested by their mentor.
  - You have contextualized the central concept(s) of your project. This may be achieved by situating the concept(s) in a "real-life" application. Or it may simply be a matter of laying the theoretical foundation and mathematical importance for the concept(s).

- **Oral Presentation**. You give a well prepared, well practiced, and well presented 20-25 minute talk which clearly conveys an appropriate selection of the important mathematical concepts of your project.
  - There is clear evidence that you spent the time to carefully and fully prepare your talk and to practice your talk. You do not show an over-reliance on prepared notes.
  - The talk is well organized and flows well from point to point.
  - You have chosen a reasonable amount of content for your talk and you present it in a clear and understandable manner for the average senior mathematics major.
  - Your voice is clear, not too loud or not too soft, and the pace is not too fast or not too slow.
  - You engage the audience and you are responsive to the audience, demonstrating flexibility in your presentation when needed.
  - You appear to be relatively calm and controlled in your presentation.
  - You effectively use visual aids (such as the overhead, computer projection systems, manipulatives, etc.) if and when appropriate.
  - You are able to respond appropriately to reasonable audience questions about your topic.
- **Written Paper**. Your paper is well written and clearly conveys all of the important mathematical concepts of your project.
  - Your paper is clearly written and contains an minimum of distracting grammatical or stylistic errors.
  - Your paper "looks good." In other words, it is presented in a relatively standard format on quality paper with reasonable margins. The integration of mathematical symbolism into the text is not distracting for the reader.
  - Your paper has a clear introduction which focuses reader attention to the topic(s) and prepares the reader for the remainder of the paper.
  - Your paper flows well from one point to the next and is easy to follow.
  - All of your work is clearly and fully supported with appropriate examples and/or well-reasoned arguments or proofs.
  - You cite your sources appropriately in the body of the paper. You have not plagiarized from any source.
  - The paper contains all of the important mathematical concepts of your project and clearly ties all of these concepts together in a meaningful and focused way.
  - Your conclusion helps the reader bring together the important ideas of the paper.
  - You have an accurate and complete bibliography.
- **Growth**. There is evidence of a great deal of personal and/or intellectual growth on your part in completing this project.
  - The content of this project clearly challenged you mathematically either because it introduced you to a completely new concept, or it required you to take a familiar concept and work with it at a higher level or approach it in a complex way.
  - Your project was creative or original in the ways you dealt with the mathematical content or in the presentation of that content.
  - The choices you made while working on the project indicated your desire to challenge yourself and grow as a mathematician.

You will earn a **B** if your overall work falls between the evaluation criteria for an A and a C, or if your work meets a number of criteria in both the A and the C ranges. In particular, you may earn a B if your work does not meet the content criteria for an A even though you meet the remainder of the A criteria.

You will earn a **C** if your work, on the whole, meets the following criteria.

- **Content**. The project (as presented through your written paper and oral presentation) demonstrates an understanding of some area of mathematics which goes beyond fundamental work from previous courses.
  - You have established a purpose for your project, but your work may not always remain focused on your central concept(s).
  - Your work shows an understanding of some area of mathematics that is in some ways "new" to you, but this understanding may be relatively shallow or limited.
  - For the most part, your work is mathematically accurate, with occassional lapses in understanding, precision, and/or logical development.
  - Although you have not plagiarized existing work, your project does not bring anything new to this work, but rather seems like a paraphrasing of this existing work. Your project does not convince us that you have a strong command of the topic(s).
  - Your work contains reasonable examples, arguments, or proofs of the important points. But the support may be lacking in places.
  - You have used available resources (texts, articles, faculty, peers, others), but could have used them more fully and more effectively.
  - There does not seem to be a context for the content of your project. Either you have not situated the concepts in a "real-life" application, or you have not presented the mathematical foundation upon which your concepts are built.
- **Oral Presentation**. You give a 20-25 minute talk which covers a selection of the concepts of your project.
  - Although you have prepared and presented your talk, there is no clear evidence that you have spent substantial time in this preparation or in practicing your talk. This may be indicated by an over-reliance on prepared notes, a seemingly disorganized presentation which does not flow well, or a presentation style that does not seem well rehearsed.
  - You have not chosen a reasonable amount of content for your talk. Either you have tried to cover too much content, and thus must do it quickly and without depth or support. Or there is a lack of content in your talk.
  - You have presented a talk which is either aimed so high that the average senior mathematics major can understand very little of the central concept(s), or your presentation is beneath the level of the audience's mathematical capacity.
  - Your presentation has problems in at least one of the following: voice (either too soft or too loud), pace (too fast or too slow), engagement (you are seemingly oblivious to the needs of the audience), control (you appear extremely nervous and fidgity).
  - You either use no visual aids or your use of visual aids is problematic. Some examples follow. Your use of the overhead is problematic because you stand in the way of the projection, you block the view of the audience throughout the presentation, or you seem unrehearsed or unorganized with the transparencies. The visual aids may serve no purpose in connection with your project. The use of a computer system creates more distraction than understanding.

  - You cannot respond to reasonable audience questions about your topic.

- **Written Paper**. Your paper is complete and presents your topic. However, there are significant problems in writing style, clarity, presentation, or mathematical support.
  - In reading the paper, the reader may be distracted by relatively frequent grammatical or stylistic errors.
  - The presentation of your paper is distracting in some way. The type-setting or formatting of the paper may be non-standard such that it is distracting to the reader. The integration of mathematical symbolism may be incorrect, sloppy, or otherwise distracting.
  - The introduction to the paper does not grab the reader's attention or clearly focus the reader on the important topic(s) of the project.
  - Although the paper is complete in terms of including all the main points associated with your topic, the paper does not flow well from point to point.
  - Your paper contains reasonable examples, arguments, or proofs of the important points. But the support may be lacking in places.
  - You cite your sources appropriately in the body of the paper. You have not plagiarized from any source.
  - The paper, in particular the conclusion, does not tie together the important concepts in a meaningful and focused way.
  - You have an accurate and complete bibliography.

- **Growth**. Although this project demonstrates an understanding of some area of mathematics which goes beyond fundamental work from previous courses, there is no evidence of serious personal and/or intellectual growth on your part in completing this project.
  - The project went beyond fundamental concepts you had previously experienced in mathematics. But the choices you made in completing the project did not challenge you mathematically or intellectually.
  - The way you dealt with the content of the project and the way you presented the project was relatively standard, showing no exceptional creativity or originality.

You will earn a **D** if your work, on the whole, does not meet the evaluation criteria for a C, but your performance also does not fall under any of categories below that would result in a grade of F.

You will earn an **F** if your performance falls under *any* of the following categories.

- The content of your project is wholly insufficient. For example, the project is on a topic that was a fundamental part of a course you have taken, and you have not done anything beyond the fundamentals you may have done as part of that course. Or, the project covers a relatively trivial topic in a very shallow and limited manner.
- You do not submit a final paper by the date due. Or the final paper you do submit is incomplete or incomprehensible to the point that a judgement on content is nearly impossible, or the presentation of the paper is of such poor quality that it is virtually unreadable.
- Your paper contains plagiarized material.
- You do not make an oral presentation of your project.

Note for Honors Candidates. To receive departmental honors, there is the expectation that, in addition to GPA-level and coursework expectations, the candidate will produce a comprehensive project of more significant content and higher quality than the typical senior. However, in the grading of Mathematics 400, the comprehensive project will be evaluated using the same set of expectations as all other seniors.