

Perspectives on the Evolution of Structures

Final Project Assignment

The final project for this course, to be completed in groups of three (JHU) or two (UMass), is to write a critique of a structure as a work of structural art.

The paper should be 20 (JHU) or 15 (UMass) pages long, double-spaced, and in a 12 pt font with normal margins. Figures, tables, and calculations count towards the page limit, but the references section does not.

In order to be successful this paper must:

- a) Begin with a clear, concise, and strong thesis statement,
- b) Be well organized and clear, including correct grammar and spelling
- c) Frame the critique using the “3 S’s” of social, scientific, and symbolic meaning
- d) Support the thesis with scholarly research
- e) Identify details of the structural form that have engineering and aesthetic explanations and implications
- f) Identify the loads acting on the structure and explain how these loads are transmitted to the ground
- g) Use illustrations of the structure in support of the thesis statement
- h) Draw comparisons between structures, preferably using illustrations of the comparison structures
- i) Contain a calculation of the structural behavior that adds to your interpretation (probably Scientific) of the structure. You may perform a hand calculation or use structural analysis software (www.mastan2.com). The calculation homework provides good examples of how to use calculation
- j) Reference at least two non-electronic sources
- k) Cite all sources properly following the citation style guide available at the course website, and
- l) Include in an appendix (not counted towards the 15 pages) the printed results of a search of at least one of the library’s scholarly indices, such as Web of Science or the Avery Index to Architectural Periodicals.

This is not an exhaustive list, and no direct correspondence can be made between the number of items satisfied and the grade received. The necessity to perform calculations on your structure (point i above) may require some additional study on the part of your group. The instructor(s) are willing to help with this, but please begin to organize your information as soon as possible.

UMASS Timeline and due dates:

Week 11 Tuesday (4/14): Project workshop: By this time you should have a topic, and have done much of your background research. Bring a draft thesis statement, at least one image of your structure, and a draft outline to class. You will engage in a peer editing exercise of the thesis and outline with another group. You will submit to the professor your choice of structure.

Week 12 Tuesday (4/21): Bibliography, outline, and search results due: You must submit at this point an outline, a bibliography, and the results of a search of a scholarly index from the JHU/UMass library. These will be collected and marked.

Week 13 Tuesday and Thursday: Project conferences: Individual meetings with the instructor will provide you feedback on your thesis, outline, bibliography and general approach to the assignment.

Week 14 Tuesday and Thursday (and Week 15 Tuesday for UMass): Project presentations: The project should be essentially complete by this time, when you will be asked to make oral presentations of ten to fifteen minutes to the class about your research topic.

Last day of class at 5pm: Final papers due at the professor's office.

JHU Timeline and due dates:

Week 11 Thursday (4/16): Project workshop: By this time you should have a topic, and have done much of your background research. Bring a draft thesis statement, at least one image of your structure, and a draft outline to class. You will engage in a peer editing exercise of the thesis and outline with another group. You will submit to the professor your choice of structure.

Week 12 Tuesday (4/21): Bibliography, outline, and search results due: You must submit at this point an outline, a bibliography, and the results of a search of a scholarly index from the JHU/UMass library. These will be collected and become a portion of the project grade.

Thursday 4/23 In addition to class we will have project meetings between each group and Professor Schafer.

Friday 4/24 continued project meetings – every group should meet with Professor Schafer.

Week 13 Tuesday and Thursday: No class – work on your projects!

Week 14 MONDAY 4 MAY: Project Presentations exact schedule TBA, but it will take a good chunk of the day, plan on it. (75 people in the class/3 = 25 presentations!)

Final paper due date. Per JHU regulations final projects are due at the same time as the scheduled final exam in classes which replace the final exam with a final project/paper. This means the papers should be due on a Saturday, since this is not reasonable the papers are due the following Monday. Papers are due Monday May 11 by 4pm, printed out (no electronic files), 203 Latrobe Hall

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Final Project Assignment
Topic selection notes

As you consider what structure you will write about for your final project I encourage you to think creatively. The structure should be one for which you feel you can explain the scientific meaning, and for which sufficient published material exists to fulfill the requirement that the paper address the social and symbolic meaning of the structure.

One excellent place to look to find candidate structures is the structurae website, www.structurae.net.

Santiago Calatrava is probably the most prominent engineer/architect practicing today. His structures are visually very striking, and can make excellent topics for this project. In past year's, however, Calatrava bridges have been extremely popular topics, and this has put a strain on the resources of our library, and has also detracted from the intellectual diversity of the final projects. Therefore, while you are welcome to propose working on a Calatrava structure, if too many such proposals are received, the professor will choose which ones get to proceed, and will ask some other teams to find an alternative topic. (This is not ideal, but is best for the class as a whole.)

There are two possibilities for a final project that does not directly address the social, symbolic, and scientific meaning of a particular structure. These are:

(1) Develop computer models that demonstrate some of the structural engineering behaviors and principles described in the class, or

(2) Add significantly to the engineering descriptions on the websites www.ce.jhu.edu/baltimorestructures or www.ce.jhu.edu/western-mass-structures and add new structures to the database. This topic requires experience writing HTML code for web pages (but this is not hard). These are both extremely serious projects, and, should you wish to pursue them, you should quickly begin discussing this possibility with Prof. Schafer. These projects are likely to entail more work than a standard project, yet could significantly enrich the course for future years.

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Final Project Assignment
Annotated bibliography and outline

Note the timeline for the due date. You must submit at this point an outline, a bibliography, and the results of a search of a scholarly index from the university library. These will be turned in and marked.

It is nearly impossible to write a successful final project in a couple of days, or even a week, because the project relies heavily on research and organization. Both research and organization take time, and this assignment will make you get an early start on both of these aspects of the project.

Research, preparing an annotated bibliography:

An annotated bibliography is a list of references containing all relevant bibliographic data and, the annotated part, a short summary statement on the importance of the reference to your work. An example entry for a bibliography on the Bunker Hill Bridge is

[1] Menn C, Chandra V, Donington K. Conceptual Design of the Leonard P. Zakim Bunker Hill Bridge, Boston, MA, USA. Structural Engineering International. 14 (2004) pp. 42-45.

Christian Menn, the designer of the Bunker Hill Bridge, describes the conceptual design process that led to the final form of the Bunker Hill Bridge. Conceptual design is the preliminary process in which the form and layout of the bridge are determined without attention being paid to detailed sizing of the structural members and details. This stage of design largely determines whether the uncoded goals of economy and beauty will be achieved along with the codified goals of safety and serviceability. Menn describes the structural and site constraints that led him to choose the asymmetric cable-stayed solution, stating that cable stayed systems are the most versatile for use in dense urban environments.

Organization, preparing an outline:

At the top of your outline should be a well thought out, strongly and clearly worded thesis statement. Following this statement should be an outline of your paper in which you delineate the main ideas you want to convey in support of your thesis in the order you want to present them. Number the main ideas in order and give letters to any sub-ideas you include in the outline. Each idea should be followed by a sentence or two describing in more detail what you plan to write about in this part of the paper.

If you can compose a good outline, you will have done most of the thinking necessary to succeed on the project, and will be left only to write clear sentences and paragraphs to flesh out the outline. If you start with a poor outline it will be very difficult to compose a paper that is well organized in support of your thesis statement.

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Final Project Assignment

Project presentations

Each team will have ten to fifteen minutes (final timing will be determined in the course and communicated to you in advance of the presentation) to present their work followed by a two minute question and answer session. **Time limits will be strictly enforced.**

The presentation should convey your thesis to the class clearly and succinctly.

Two obvious approaches are to either give a brief overview of your entire argument, or to focus in more depth on one aspect of your paper. Either approach can work effectively. As in the paper, your emphasis should be on analysis and critique of the structure, rather than presentation of a litany of facts and historical information. Successful presentations can be made using several different media. Many of you will choose to use powerpoint and a combination of images, schematic illustrations, words, and numerical results. Other possible media include models and various physical props, audio and video. Feel free to be creative, provided you can stay within the time limit.

If you plan to use any powerpoint files or other computer projections in your presentations, you must provide the files to the professor before noon on the day of your presentation. (ask your professor before assuming anything with regard to presenting! Mac vs PC, Powerpoint version, videos, the list goes on and on)

You will be evaluated based on the quality of the argument, the clarity with which it is presented, and the quality of the visual aids you prepare, and your participation in the question period following others' presentations.

Attendance is required at all presentation meetings.

Preparation tips:

1. One slide per minute is a rough guide to how many slides to use if you are using powerpoint. Depending on your style you may take more or less time than that.
2. Avoid the temptation to use powerpoint's animations and transitions and fancy backgrounds. These only detract from your message.
3. Rehearse your presentation beforehand, perhaps several times, to ensure you can complete it within in the time limit.
4. Each slide is valuable. As you are being careful with crafting paragraphs in your paper, design your slides carefully so that each one supports your argument.
5. Speak at a moderate pace, clearly and at a good volume. Look your audience in the eye.
6. Use notecards if you need to. It is far better to use notes than to attempt to extemporize or memorize and wind up leaving out important information.
7. Each person in the group must deliver part of the presentation.