

**GEORGIA INSTITUTE OF TECHNOLOGY**  
**George W. Woodruff School of Mechanical Engineering**  
ME 2110 - Creative Decisions and Design  
Fall 2018

### **Cantilever Design Studio**

This week you will work in groups to build a cantilever. The goal is to build the longest cantilever in the class without touching the ground. At the end of the cantilever you need to support a golf ball. You are provided with the following materials:

1. Two, 16 oz. boxes of spaghetti
2. Rolls of tape
3. 12" Straightedge (Ruler)
4. One golf ball

This lab consists of two parts. The first will be to build a cantilever with only the spaghetti and the tape. The second will be to build a cantilever with the spaghetti, the tape, and the straightedge. You are limited to one box of spaghetti and one roll of tape per cantilever.

Each cantilever is to be based in a 48 inch by 24 inch rectangular area on a table. Each group will mark out its own rectangle with tape. The cantilever is to be based and attached only to the top of the table within the rectangle. You are not to permanently damage the table. You will be responsible for cleaning up your area, including the removal of all tape.

#### Part 1

You have 45 minutes to make a cantilever using only the spaghetti from one of the 8 oz. boxes and the tape. You should spend 15 minutes planning your cantilever (not building) and 30 minutes building it. Please be sure to generate sketches of your proposed design. *Do not start construction of your cantilever during the 15-minute planning period.*

After 45 minutes, the instructor will measure the length of each cantilever. Length will be measured horizontally from the leading edge of the table to the furthest point on the golf ball.

Make a sketch of your cantilever, label the parts and report its length. Describe and discuss your design using the sketch. You may also use photographs of your cantilever, but you must sketch it. If you do use photographs of your cantilever, please be sure to include labels on the photograph. Discuss what worked and did not work. Discuss how you would improve your design.

#### Part 2

You have 45 minutes to make a cantilever using the spaghetti from one of the 8 oz. boxes, the tape, and straightedge. You may **not** reuse the materials used or left from the first part of the lab. You should spend 15 minutes planning your cantilever (not building) and 30 minutes building it. *Do not start construction of your cantilever during the 15-minute planning period.*

After 45 minutes, the instructor will measure the length of each cantilever. Length will be measured horizontally from the leading edge of the table to the furthest point on the golf ball.

Make a sketch of your cantilever, label the parts and report its length. Describe and discuss your design using the sketch. Discuss what worked and did not work. Discuss how you would improve your design.

Deliverable due at the end of this studio

A draft of an executive summary of the project that is to be reviewed and critiqued by your instructor and TA with your team in studio. In your summary you should reference any figures that you sketch. These sketches should be on separate pages and not integrated with the executive summary. The summary should be a maximum of one page in length, using 12 point font, 1 inch margins and a line space setting of 1.5.

Deliverables due at the beginning of studio next week

An updated version of the project executive summary that takes into consideration the comments provided to you by your instructor and TA. The summary should be a maximum of one page in length, using 12 point font, 1 inch margins and a line space setting of 1.5. Copies of any supporting sketches should be correctly formatted and labeled, and they should be attached to the back of the executive summary. *For this studio only, you may submit hand drawn figures and sketches.* Comment on the lengths of your cantilevers, as well as the lengths of the other groups in the class. Comment on your relative performance.

The content of the executive summary should follow the description discussed in section 11.1 of the text. Here is a brief overview of that information:

1. A **Goal** statement. This explains the project's objective, and it can include pertinent background information.
2. A **Methods** statement (or an Action statement). This explains the plan or procedure that was used.
3. A **Results** statement. This explains what was created or developed (or other any other result, depending on the project). Results are presented by displaying and describing visual displays such as diagrams, CAD drawings, or planning tools, depending on the phase of the project. Results displays should be cited in the summary's text, but they should not be presented in the body of the summary. Displays should be attached to the document on extra pages that you can designate as an Appendix.
4. A **Conclusion** (or Takeaway Point). This should present a takeaway point explaining what pertinent lesson was learned as from the project results. Recommendations are appropriate when the project will be continued into the future; this will not happen in for the Introductory project in ME 2110.

For an example of a well written executive summary, please see the Studio supplemental handout.

**Please submit 1 hard copy of this abstract and submit 1 electronic copy on Canvas.**