

## Step 4 – Working Legs

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 [courseworks2.columbia.edu/courses/134953/assignments/705444](https://courseworks2.columbia.edu/courses/134953/assignments/705444)

- Due Oct 26 by 11:59pm
- Points 100
- Submitting a file upload
- File Types pdf

The goal of this step is to print and verify initial power, control, and motion of legs, and adapt the CAD if necessary.

3D print the leg component and part of the body (as necessary) to demonstrate at least one moving leg. Assemble the leg using all components, bolts, screws cables, and mounts as described in the CAD. If you observe any problems, such as form and fit issues due to printer resolution, adjust the CAD. Validate maximum range, interferences, and other design assumptions. Address and correct any issues and reprint models with issues addressed.

Present photos of your printed robot leg in PowerPoint. Include side-by-side images of printed parts and detailed CAD. Show movie of moving leg. For this stage motor can be controlled manually using the standard motor control application provided by the motor vendor. Show a close-up of any issues and solutions.

### Hand in:

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A PowerPoint presentation of your printed leg. Include side-by-side images of printed parts and corresponding CAD. Show frame sequence of moving leg. Show close up of any issues and explain how they will be addressed.

Append this assignment's slides to all previous slides from previous assignments. This assignment should be last, starting with a clear title slide. Save everything as a single PDF and upload the PDF. Any movies should be shown as a representative video frame plus a link to a video online.

### PowerPoint Format:

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1. Page 1: Title slide: Robotics Studio MECE 4611, Semester, Assignment 4, Full name(s), UNI(s), Date/Time Submitted, Grace hours (before submission, used/gained, after submission), Title of robot, Working Leg Photo
2. Pages 2-X: Renderings as described above

### Grading

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Grading of this part is incremental. You get points for various aspects and the more you do the more you get. Maximum 100 points. Following are tentative rubrics you can receive points for:

1. 5 Points Title slide complete
2. 5 Points overall aesthetics, layout and formatting of the slides
3. 8 Points 3D Renderings of robot in perspective, with focus on leg
4. 8 Points posting some video of the moving leg on Discussion Boarda (show screenshot, provide link)
5. 8 Points photo of leg
6. 8 Points Leg moving (key video frame sequence + link to video)
7. 8 Points extreme leg positions tested and measured
8. 8 Points form/fit issues identified, listed and addressed (show how)
9. 8 Points all components properly bolted and connected (with inserts)
10. 8 Points 3D-print quality, support structure removed
11. 8 Points parts sanded and painted
12. 8 Points Leg Modularity demonstrated
13. 8 Points Two or more legs tested in tandem
14. 8 Points Cables routed properly and securely