Most Critical Module (MCM) Demonstration Information,

First a brief treatise on hardware demonstrations in general:

Hardware demonstrations are both the easiest and the most stressful presentations you will do as an engineer. The hardest part from a communication standpoint is providing context. You usually have hardware in front of you that does something super cool and thus automatically draws the audience's attention and provides sufficient interest. Thus, you simply need to demonstrate the abilities of the device/design in a way the proves the design fulfills a need relevant to the audience. This is a good time to be sure there are no flaws in your functional requirements. During the initial part of the design process, we said "if it fulfills this set of functional requirements then it solves the problem", so natural we just need to demonstrate the functional requirements. However, if the functional requirements weren't stated in a way that is quantitatively measurable what are we to demonstrate and prove? This is why early on last semester we talk at length about defining your problem (and more importantly your solution) in a way that can be measured to prove you were successful. If you have done that well, then the hardware demonstration becomes easy and fun. Then comes the stress -- will the prototype perform as expected during the demonstration? This is often make or break for new products. Reliability becomes key, and reliability is impossible without significant testing. I had an adviser that wouldn't do a hardware demonstration without 9 successful test trials in a row previous to the actual demonstration. Depending on the situation that might be excessive or it might be insufficient. Either way, the point is you need to test, test, test, ... to find and correct all bugs before the demonstration. If the product works as advertised, hardware demonstrations are very rewarding.

Now some MCM specific details:

As mentioned in the title, or if you forgot from last semester, MCM stands for “most critical module.” This is the module in your design that everything else hinges on. If it works you, and your design, are likely to be successful; if it does not you, and your design, are likely to fail. Ultimately, you (or more specifically your design) defines your MCM. As such, you absolutely want to ensure the MCM is successful as early in your process as possible.

In a typical year, the hardware demonstrations during the semester are there to help you in two ways. One, they are timed to ensure you are making at least minimum progress on your hardware (your manufacturing really should be way ahead of our demo schedule). Two, they are intended to help you hone an appropriate demo for your final demonstrations. The first hardware demonstration, the MCM demo, is intended to be a learning experience more than anything else. Thus, the rubric is pass/fail. You should demonstrate the features and abilities of your MCM compared to your functional requirements and/or problem statement. Show/discuss the good, the bad, the lessons learned, the deviations in as built vs design, etc. If you have hardware that addresses your MCM (highest risk(s)) and operates in the context of the functional requirements and addresses yo you get full credit. There is not a strict time limit. You have a minimum of 5 mins and a maximum of 1 hr; whatever it takes to prove your MCM works and thus you are likely to be successful.
**When:** As scheduled by you during team meetings the week of October 4. You should attempt to pass the MCM gate on Monday. If for some reason I am unconvinced of the success of your MCM and you “fail” that leaves Wednesday as a backup to correct any issues and pass the gate.

**How:** Hybrid presentation. As much of the “demo” should be “live” as possible. I’d like to be able to ask what-if scenarios and have you be able to adjust your demonstration and show me the MCM operation. “Live” might mean in person (as long as we meet COVID guidelines), it might mean some subset of the team is live in person others on zoom, live might mean through zoom where the presenter has a good camera and can show the hardware operating in real time.

**Evaluation:** Pass/Fail. You must convince me your MCM works.