

# **Microsensors, Implantable Devices and Rodent Surgeries for Biomedical Applications**

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**Week - 05**

**Lecture - 17**

Hello and welcome to this lab component. We have seen in the theory class how the clean room looks like, at least in a schematic. Now, we will show you how to enter the clean room and what the protocols are, particularly the governing protocol. So, what are the different kinds of personal protective equipment? Whether it is hand gloves, glasses, masks, shoe covers, hair nets, beard covers, and so on. In the lab, you will see one of the TAs showing you how to enter the clean room. Once you see how it is done, you will have a better idea of what the clean room looks like. I hope you enjoy this video, and I will see you at the end of the video.

Hello, everyone, and welcome back to the course. Myself, Anujkumar Prajapati, I am a PhD student at BEES Lab in the Department of Electronic Systems Engineering at IISC. In today's lab session, we will be visiting the clean room. Now, what exactly is a clean room? It is basically a controlled environment where parameters like temperature, humidity, and the concentration of particles are kept in a controlled range which is favorable for our device fabrication. As the professor might have discussed in the coursework, the devices that we make or use have critical dimensions in the order of microns.

Now, conventional machining cannot produce such fine dimensions. So, the processes that we carry out require a very controlled environment, which is the clean room, and today we will be seeing how. Let us get started with the clean room. So, welcome inside the clean room. Once we enter this clean room, there are certain protocols that need to be followed.

The first and foremost requirement is that whatever samples you have must be kept in a desiccator under vacuum conditions. To bring these samples inside, you need to make use of the static pass-through chamber. This chamber has a two-way door that connects the inside and outside of the clean room. The advantage is that if you need to transfer goods more than once, you do not need to enter the clean room repeatedly, which might disturb the flow pattern. Okay.

The next thing would be the governing procedure. This is another part of the protocol. Whenever I or any user enters the clean room, they need to make sure that they are wearing the proper gown in the proper order. So, let us get started. First, we will be wearing the face mask and the hair net. Make sure the nose clip is firmly attached to your

nose so that air does not escape from the upper side. Ensure that all your hair is covered. If you have long hair, try to make it into a bun so that the hair net covers the total volume of your hair.

Next, I will be wearing the shoe covers. Ensure that you only cross this partition after wearing the shoe cover. So, now the next step would be to wear the suit. This is the garment storage cabinet where we store our clean room gowns. There is a laminar flow coming from the top to the bottom, which removes any dust particles that might have accumulated on these suits.

This is a clean room gown. Every user who uses the clean room has their dedicated clean room gown. So, this is mine. The procedure is, first, hold it from the top, pull down the zip, make sure the gown does not touch the ground much, or else it will accumulate more dust. Put your feet in one at a time.

Next, put your hands in. After that is the hood. Ensure that the elastic at the hood is properly around your forehead. The next part is to wear the shoes. These shoes are ESB protected, which would protect you in case there is an electrical contact.

Just like the clean room gown, even the shoes are dedicated for each user according to their sizes. Now, the gowning procedure is complete, and we are ready to enter the clean room. But before that, we need to stand on the sticky mat so that any dust particles that we might have been carrying from the gowning area will stick to this mat and not enter the clean room. Once we are inside the clean room, we can take the sample from the material pass box. As I mentioned initially, the material pass box is a two-way door.

By opening the outer door, you can keep the samples inside, and by opening the inner door, I can take my samples inside the chamber and also inside the clean room and vice versa. So, this is the material pass box. I will just open the door, take out my desiccator, close it again, and now I will vent out my desiccator to take the samples. You might be able to hear there is a hissing sound; that is the ambient air rushing into this desiccator. Here are my samples.

Now, I will be taking them for further processing. Thank you. So, you have now seen the lab, and what you have seen is that there are different kinds of clean rooms. The one you have seen is class 10,000, and some of the sections are class 1000. Within the wet benches that are there, it is class 100 air quality. Once you understand how to enter the clean room and what the governing protocols are, in another lab class, we will see how the PVD system works, particularly looking at the EBMU operation, followed by sputtering and wet etching. Okay. For each lab, I will give a little bit of an intro, then we will have the lab, and then again at the end of the lab, we will see what we have learned through that particular lab video.

So, till then, take care. I will see you in the next class. Bye.