Training For the 4” Glass Prototyping Line

This document describes the path for becoming trained to use the 4” line.

In general, once new users have put in a project request for cleanroom use or training, a dialogue will be established between the user and cleanroom staff. Typically, new users will be directed to begin training for working in the cleanroom by learning the 4” line. This will allow all users to develop a good sense of processing steps, equipment, materials and hazards and to simultaneously conserve and protect equipment and material resources.

Once you have been informed that you will be trained in the 4” line processes, you will need to schedule four training sessions for different parts of the processing line.

Session 1: 1-2 hours
General 4” Line processing path layout, Signing up, Logging in, Gowning, Glass Scribing, Ultrasonic Cleaning

Session 2: 2-3 hours
Photoresist Spinning, Mask Cleaning, UV Exposure, Chemical Processing

Session 3: 1-2 hours
Polyimide Spinning, Curing, Rubbing

Session 4:
Spacer Application, Gasket Dispense, Assembly, Pressing and UVCure
(Array scribe-out, if needed)

Before each session, users are required to watch the informational training videos listed on our web site, and to read the accompanying process material and material safety data sheets. If it becomes obvious during training that these things have not been done, training will be halted and sessions will need to be rescheduled. Training is mostly done for exchange of useful technical information, not for showing users where power buttons are or how to turn on a resource utility. Come prepared and the training process will be much more useful and efficient.

The four sessions should not be scheduled on consecutive days as time is needed to both review all the relevant materials, as well as to mentally process information learned during training.

After training is completed (all four sessions), each user will need time to practice the relevant processing steps, while being chaperoned by facility staff until such time as some acceptable level of competency (to staff) is reached. Then users will need to go through a check out process while being observed by but not assisted by staff. Should a user complete a check out procedure, this will give the user access to begin working independently in the future. However, if staff feels that the user was
not competent enough to work independently, then the user will be told why at the end of this session and will be informed that they will need to go through the check out procedure again at another time, and possibly even spend more time being chaperoned before being allowed to do so, depending on the level of short coming. Minor handling issues that improve with experience will not be automatic disqualifiers, but some issues will result in automatic disqualification. If the user fails to put on safety glasses before starting or does not keep them on the entire they are working, this will result in a fail. If the user uses the equipment in any way that would place either the user or the equipment at risk of damage, this will be an automatic fail. If the proper standard processing procedures are not followed, this could result in a fail, depending on the nature of the deviation. If the user does not clean the areas used to a high enough level, return all items to their proper storage location, or does not turn off all utility resources, this could also be a fail, depending on magnitude of issue.

The cleanroom is a serious and potentially dangerous working environment. User must realize that this training process is our firewall for making sure everyone is properly trained to work in this area, in a safe, responsible and considerate manner. We take the check out procedure very seriously because it is our last chance to see that users will be safe, follow procedures, protect equipment from harm, use materials responsibly, be mindful of the others working in the area and operate such that the cleanroom runs at high efficiency.

Once all training check outs have been completed, users will be added to certified users lists for the pieces of equipment on which they have been trained. Realize that this allows for users to sign up and work on these pieces of equipment independently, but this does not give free access to other areas of the facility. This initial level of training only gives users the access to standard processes on limited equipment. Anyone who then deviates from the standard procedures, operates in an unsafe manner or uses other equipment for which they have not been formally trained is subject to losing cleanroom access.

Here is a summary of the path to becoming trained in the 4” prototyping area:

1. Go here: [http://www.lci.kent.edu](http://www.lci.kent.edu)
   a. Click on Members
   b. Pull down to Member Log-in
   c. Login with your email address and password, hit Submit
   d. Scroll down to Prototype Facility and hit GO
   e. Select GO next to Project Request

2. Fill in a Project Title
   a. Check the box next to Training Request
   b. Fill in a detailed description of what your project is and what you want to do in the cleanroom.
   c. Fill in any other details you require
d. Hit the Submit button in the upper right corner

3. Return to this location regularly to enter into a dialogue with staff
   a. Follow procedure 1a thru 1e, except for 1e, Select GO next to Project
   b. If staff has responded to your request and has questions, you will see an entry fro staff.
   c. Submit a new response by hitting the Respond button next to the last entry in your project request, and then hit Submit

4. Once all the questions have been answered, you will be directed to study the training materials for each process step that your project requires. In general, all of those resources can be found here:
   b. Training videos for each process are listed for each process step and the general password for these is lci123

Here is the general list of 4” line equipment most likely to be needed by most users: (all equipment located in 4” line room immediately inside the air shower entrance, except the VPI glass scriber, which is located in the Class 10,000 prep area).

Glass Scribing (VPI)
Glass Ultrasonic Cleaning (Branson)
Photoresist Spinning (Laurell1)
UV Mask Exposure (NuArc, low resolution)
Chemical Development (Bench 2, Bench 4)
Chemical Etching (Bench 2, Bench 4)
Chemical Stripping (Bench 2, Bench 4)
Polyimide Spinning (Laurell2)
Curing (Ultra Class100 Oven))
Rubbing (Hand Rub Station)
Spacer Dispense (Spacer Box)
Gasket Dispense (Asymtek2)
Assembly
Press and UV Cure (Dymax)
Array Scribe-out (if needed) (VPI)

NOTES:

Facility staff is available nearly at all times for assistance even if a user is already certified to work independently. It is much preferred that users ask for assistance whenever there is need. No deviations from standard processing, no modifications to existing equipment or utilities and no nonstandard materials or chemicals are allowed in the 4” processing room.
The cleanroom facility is shut down and locked at 5 pm. Some utility supplies are turned off at the mains during nonwork hours. Users are not permitted to remain in the facility after 5 pm. It is against Kent State University safety regulations for users to be in labs after hours or alone where external assistance to emergencies is unlikely to be available. Therefore, please do not ask to work late. It is advised that users start early in the day to avoid potential discontinuity in work flow due to the facility and utilities going down at 5 pm.

The cleanroom facility is under closed circuit TV surveillance at all times. This is pointed out during initial training. Because the room is remote, with no direct visual observation possible from outside hallways, the cameras serve as an added layer of safety monitoring and the recordings allow for operations to be reviewed in the event of any issue. Users operate in the facility with the knowledge that this is the case and consent to their use.