Operation Manual of Ellipsometer
Updated June 7, 2006

I. Description
Ellipsometer measures thickness of films. A laser beam is shined, reflected on a sample and then detected to measure intensity and phase shift of the laser beam. Thicknesses of films are extracted by software based on the intensity and phase shift.

II. Operation Procedure
1. Prepare the Measurement
   - Turn on the key on the measurement unit to power the laser. Let the laser warm up for 15 minutes prior to a measurement
   - Load a sample on the measurement stage.
   - Adjust the two smaller screws underneath the stage to level the stage, until the centers of the two crosses overlap. Turn the table if necessary.
   - Open the laser shutter.
   - Maximize the signal. Turn the analyzer to get the maximum signal. Then turn the z-knob (the large knob underneath the stage) to maximize the signal again.
   - Set the mode switch to A.

2. Carry out Measurement
   - Double click GEMP icon to launch the ellipsometer measurement program.
   - Open the Measure&Calculate box by either the Ellipsometer menu’s Measure&Calculate command or the measurement&calculate button.
   - Check to make sure the angle (Phi) setting corresponds to the angle of the incident laser. (note: polarizer is always 45° and the wavelength is 6328 Å).
   - Select one calculation mode depending on your needs:
     - AutoFix Nf1 (enter Nf & Kf for the substrate and Nf for the film)
     - Thickness1 & Nf1 (enter Nf & Kf for the substrate and Kf of the measured layer)
     - Thickness1 & Thickness2 (enter Nf & Kf for the two layers and the substrate)
     - Shortcut buttons (there are two options: Thin Oxide and Thin Nitride)
   - Enter estimated thickness to confine the thickness range.
   - Click Measure&Calculate button to measure and calculate.
   - Switch the mode to AS.

III. Shutdown Procedure
When finished for a day, close the laser shutter and switch off the key on the measurement unit. If the system is left unused for just an hour or less, leave the laser on because laser can stabilize only after at least 15 minutes of warming up.

IV. Help Info
In case of need, please contact Hongzheng Jin at hjin@princeton.edu.