1. **Number and title of course:** EECS 143, Microfabrication Technology

2. **Course objectives:** Process integration design of MOS and MEMS devices based on fabrication modules. To establish relationships between process parameters and device parameters. Implementation of fabrication and testing methodologies in laboratory.

3. **Topics covered:**
   - Fabrication of monolithic integrated circuits and surface microstructures, with emphasis on silicon planar technology: consideration of mask layout, photolithography, thermal oxidation, ion implantation, dopant diffusion, film deposition, epitaxy, etching, contacts and interconnections, and process integration issues.
   - Electrical properties of semiconductor materials and integrated circuit devices; characterization of diodes, capacitors and MOS transistors, including effects of parasitic elements. Mechanical properties of polycrystalline silicon and oxide films; characterization of surface microstructures to evaluate Young’s modulus, residual stress and quality factor.
   - Last two weeks of lectures are selected modules by the instructor on nanofabrication techniques, future trends, green manufacturing, and electronic products of current interest.
   - A four-mask process will be carried out in the laboratory to fabricate functional semiconductor devices, simple IC circuits, and surface microstructures. The process and devices will be characterized by electrical or mechanical testing.

4. **Relationship of course to program objectives:** This course provides both rigorous understanding of microfabrication principles and students are trained to identify, formulate, and solve challenging design problems for various integrated circuits components and MEMS structures. The students apply their knowledge of math, science and engineering to analyze and model basic fabrication modules. They gain knowledge of emerging technologies and their impact on state-of-the-art processing designs. They acquire hands-on fabrication and characterization experience with modern tools and techniques in the laboratory.

5. **Prepared by:** Nathan Cheung (2/17/06)