This manual is intended to address specific safety issues you will deal with in AT 560. It is not intended to be a comprehensive guide to laboratory safety.

**Lab Rules**

1. No eating or drinking in the lab at any time. No smoking or application of cosmetics in the lab. Always wash hands and arms thoroughly before leaving the laboratory.

2. Every individual entering the lab must wear eye protection (safety glasses or goggles), a laboratory coat, and sturdy, leather shoes that cover the entire foot (no sandals, canvas shoes, high-heeled or open-toe shoes). Clothing must provide protection from splashes and spills (no shorts, skirts, or dresses). Long hair and loose clothing should be constrained.

3. Contact lenses should not be worn in the laboratory. They can hold foreign material against the cornea and may be difficult to remove in the case of a splash. Soft contact lenses also may absorb and retain chemical vapors. If the use of contact lenses is required for therapeutic reasons, fitted goggles must also be worn.

4. Gloves should be worn when handling corrosive or toxic materials or solvents. Prior to each use, inspect the gloves for wear, cracks, or small holes that might compromise the protection they offer. Wash and remove gloves immediately following use to prevent spreading the chemicals handled.

5. No horseplay is permitted in the lab.

6. All handling of concentrated acids and toxic compounds should be done in the fume hood. Goggles (or a face shield) and gloves should be worn during this procedure.

7. Chemicals should be returned to their designated storage location immediately following use. Do not store chemicals in the fume hood.

8. Before working in the laboratory, you must be familiar with the location and use of laboratory safety equipment including the eye wash, shower, fire extinguisher, spill kit, and first aid kit.

9. All chemicals you store must be labeled with your name, date, and a description of the contents.

10. No toxic or corrosive materials are to be disposed of down the drain. Consult the instructor or TA regarding proper disposal of any chemical waste you generate. It is important to minimize waste generation.

11. Broken glass should be disposed of in a designated container.
Laboratory Procedures

1. Use of the Fume Hood.

Before each use, be sure that the fume hood is operating properly (you can check air flow by holding a thin strip of tissue paper in front of the opening. Place the sash at or below the designated line. All working materials should be located at least 6 inches back from the opening. Keep your face outside the plane of the sash and be alert to air flow changes which can occur in conjunction with movement near the hood or changes in room ventilation (e.g., a door being opened).

2. Working with strong acids.

You may have occasion to work with sulfuric, nitric, or other strong acids. These are highly corrosive materials which should be handled cautiously inside the hood. Neoprene gloves and goggles should be worn while handling these materials. When retrieving strong acid from a large container, pour it first into a beaker from which needed amounts can be retrieved by pipette. When preparing aqueous solutions of strong acid, always add acid to water and remember that the strong heat of solution can lead to rapid temperature rises. A container will be supplied for disposing of strong acid remaining in the beaker. Do not return unused acid to the original container.

3. Dealing with a fire.

Activate the fire alarm. Notify the instructor, TA, students, and other occupants. Only attempt to control the fire if you are trained in the use of a fire extinguisher and the fire poses no threat to your safety. Otherwise, evacuate immediately. Notify the TA, instructor and fire fighters of any chemical involved or which could become involved.

4. Chemical spills on personnel.

For spills covering small amounts of skin, immediately flush with flowing water for at least fifteen minutes. If there is no visible burn, wash with warm water and soap, removing any jewelry to facilitate removal of residual materials. Check the Material Safety Data Sheet to see if any delayed effects can be expected and act accordingly. Medical attention should be sought for even minor chemical burns.

For spills on clothing, don't attempt to wipe the clothes. Enter the safety shower, activate it, and quickly remove all contaminated clothing, jewelry and clothes. Do not waste time and do not be modest. Prompt action is a necessity. Be careful not to spread the chemical to skin or, especially, eyes. This may necessitate cutting clothing off. Continue flushing the affected body area for at least 15 minutes, longer if pain returns. Seek medical attention as soon as possible.

For splashes into the eye(s), immediately flush the eye(s) with water from the eyewash near the sink for at least 15 minutes. Hold the eyelid(s) away from the eyeball(s), moving your eyeball up, down, and sideways to wash thoroughly behind the eyelids. Seek medical attention.
5. Other chemical spills.

All spills should be cleaned up promptly, efficiently, and promptly. Notify other individuals at risk of involvement. Notify the instructor or TA and follow directions to evacuate or contain and clean up the spill. A spill kit will be available for materials used in the course, including strong acids. Before attempting any clean-up, be sure to consult the Material Safety Data Sheet for the material involved.

6. Compressed gases

Compressed gases used in this course will be supplied in high pressure cylinders. These contain substantial potential energy and should be considered potential explosives. The following considerations are important:

- Always wear safety glasses when handling and using compressed gases.
- Never direct high-pressure gases at yourself or another person.
- Cylinders should be restrained to prevent them from falling.
- Close the main cylinder valve tightly when not in use.
- When cylinders are stored or moved, their protective caps should be in place to protect the valve stems.
- Move large cylinders only with a cylinder cart.
- Never lubricate, modify, force or tamper with cylinder valves or regulators.
- Only use cylinders which are clearly labeled and only with the appropriate regulator type.