

Chemical Hygiene Plan

Danville Area Community College
Chemistry, Biology and Nursing Labs
Mary Miller Complex

1 Table of Contents

1	Table of Contents.....	2
2	Introduction.....	4
3	Acknowledgements.....	5
4	Employee Rights and Responsibilities.....	5
5	Scope.....	5
6	Chemical Hygiene Officer (CHO).....	6
7	Standard Operating Procedures.....	6
7.1	General Laboratory Guidelines.....	6
7.2	Independent Student Work in Labs.....	7
7.3	Fume Hoods and Ventilation.....	8
7.4	Special Hazards.....	8
7.4.1	Highly Hazardous Chemicals.....	8
7.4.2	Anatomy and Physiology Cadavers.....	9
7.4.3	Radiological Technology.....	10
7.4.4	Biology Courses—Blood Glucose Testing.....	11
8	Personal Protective Equipment.....	11
9	Laboratory Equipment.....	12
9.1	Glassware.....	12
9.2	Instrument Care.....	12
9.2.1	Balances.....	13
9.2.2	Melting Point Apparatus.....	13
9.2.3	General.....	13
10	Safety Equipment.....	13
10.1	Eyewash and Safety Shower Stations.....	13
10.2	Fire Extinguishers and Fire Blankets.....	14
10.3	Spill Kits.....	14
11	Chemical Management.....	14
11.1	Chemical Inventory.....	15
11.2	Chemical Storage.....	15
11.3	Safety Data Sheets (SDS) or Material Safety Data Sheets (MSDSs).....	16

11.4	Chemical Disposal.....	16
11.4.1	Storage and Labeling of Chemical Waste.....	16
11.4.2	Waste Disposal and Pickup.....	17
12	Housekeeping.....	17
13	Emergency Procedures for Accidents and Spills.....	17
13.1	DACC Policies and Information.....	17
13.1.1	Campus Emergency Numbers.....	18
13.1.2	Campus Emergency Procedures.....	18
13.1.3	Incident Reports.....	19
13.2	Chemical Spill Kits.....	19
13.3	Mercury Spill Kits.....	20
13.4	First Aid Kits.....	20
14	Training.....	20
14.1	Faculty, Staff and Student Workers.....	20
14.2	Teaching Laboratory Policies.....	21
14.2.1	General Teaching Lab Policies.....	21
14.2.2	DACC Chemistry Labs.....	22
14.2.3	DACC Biology Labs.....	22
15	Laboratory Design and Ventilation.....	22
16	Exposure Monitoring.....	22
17	Compressed Gas Safety.....	23
17.1	Operation.....	23
17.2	Additional Information.....	23
18	Medical Consultation and Examination.....	23
19	Appendix—Forms.....	24
19.1	Form #1—Faculty, Staff and Student Worker Safety Training Certificate.....	24
19.2	Form #2—DACC General Student Safety Agreement.....	25
19.3	Form #3—Chemistry Student Safety Agreement.....	26
19.4	Form #4—Radiological Technology Statement of Comprehension.....	28
19.5	Form #5—Echocardiography Statement of Comprehension.....	29
19.6	Form #6—Sonography Statement of Comprehension.....	29

2 Introduction

The Danville Area Community College (DACC) Chemical Hygiene Plan (CHP) has been written in compliance with the Occupational Safety and Health Administration's (OSHA) Occupational Exposure to Hazardous Chemicals in Laboratories standard (29 CFR 1910.1450). The following CHP contains instructions, safety measures and policies for maintaining laboratory safety in the Mary Miller (MM) Complex. This plan is annually reviewed by the Chemical Hygiene Officer (CHO) and is viewed as a working document reflecting any changes and growth in the college's facilities and general safety practices. Copies of the CHP can be found in the office of the Director of Administrative Services (Vermilion Hall); the main office in the Mary Miller Complex; the laboratory preparatory area (MM275) and with the Chemical Hygiene Officer. Anyone who works with hazardous chemicals should be informed of the contents and location of the CHP and trained as described in this CHP.

Emergency Contact Information:

**When calling a campus number on a campus phone, use only the last four digits.

Emergency Responders	9-911 (or 911 from a cell phone)
DACC Safety & Security	443-8888
Math & Sciences Division Office	443-8806 (Dean) 443-8805 (Office Specialist)
Maintenance	443-8832
Director of Administrative Services	443-8831

Chemical Hygiene Officer:

Dr. Amy L. Nicely
Associate Professor of Chemistry
Office: MM272
Phone: 443-8816
Email: a.nicely@dacc.edu

Revised on: August 30, 2022

3 Acknowledgements

Portions of the CHP have been adapted with permission from the Huntington University Chemical Hygiene Plan. Additional information was obtained from the OSHA and ANSI websites. The DACC CHP was compiled by Dr. Abby J. (Gaier) Hahne (Chemistry Instructor), Sue Mosiman (Science Lab Assistant), and Kathy Sturgeon (Dean of Math/Sciences/Health Professions Division) with the assistance of the other faculty and staff in the Sciences and Health Professions Division. Revisions have been added by Dr. Amy Nicely (Associate Professor of Chemistry).

4 Employee Rights and Responsibilities

All employees have the right to know about the health hazards associated with the chemicals and equipment with which they work. If employees become aware of a violation or feel their work environment is unsafe and report their findings to OSHA, they are allowed to do so without being fired, suspended or otherwise penalized for their complaint. Employees are responsible for keeping themselves informed on the most current safety information and should inform their supervisors of all accidents, unsafe conditions or hazards.

5 Scope

The CHP contains information for those programs and laboratory settings in which the CHO assists in maintaining safety in the Mary Miller Complex. This CHP is also for the workers and students engaging in the laboratory use of hazardous chemicals. Hazardous chemicals are defined as those chemicals, elements, or mixtures of chemicals that pose a physical hazard (such as flammability, explosiveness, etc.) or health hazard (such as a poison, carcinogen, mutagen, etc). The laboratory use of hazardous chemicals is defined by OSHA (29 CRF 1910.1450) as

- Chemical use is on a “laboratory scale” or on a scale where the reagents and containers are designed for one person to use easily and safely.
- More than one chemical and procedure are used.
- The procedures are not part of an industrial process or stimulate an industrial process.
- “Protective laboratory practices and equipment” are used to lower the potential for exposure to hazardous chemicals by employees. “Protective laboratory practices and equipment” are those lab procedure, practices and equipment which are used and have been shown to effectively minimize the potential for employees to be exposed to hazardous chemicals.

This plan does not apply to the laboratory use of chemicals that do not have potential for employee exposure. Examples of these would be Dip-and-read tests (a strip is dipped into a substance and read against a color chart) and commercially prepared tests (pregnancy tests, etc.) where all the reagents are contained in a kit.

6 Chemical Hygiene Officer (CHO)

The Chemical Hygiene Officer (CHO) is appointed by either the Dean of the Math/Sciences/Health Professions or the campus safety committee and has the following responsibilities:

- Annually review the CHP for updates in practices, procedures or equipment. This review includes an evaluation for the effectiveness of the current practices, procedures and equipment.
- Train any employees that work with hazardous chemicals in a laboratory setting.
- Work with Human Resources to maintain records of the training certificates for employees.
- Work with employees to create effective and safe Standard Operating Procedures (SOPs) for their lab practices or for instructional purposes.
- Help monitor that the CHP and safe lab practices are being carried out when workers are using chemicals.

7 Standard Operating Procedures

Standard Operating Procedures (SOPs) are a list of appropriate actions to take while using certain chemicals, instruments, equipment and laboratory setups. SOPs are put in place by the CHO, Division Dean and instructors to define where hazardous chemicals may be used; the use of containment equipment; the use of hazardous chemicals; and how to dispose of hazardous chemicals and waste. The following sections give the general expectations of workers, as well as information for specialized hazards.

7.1 General Laboratory Guidelines

- Workers are not to engage in unsafe or irresponsible behavior in the lab. This includes horseplay, misuse of chemicals or unauthorized removal of equipment or chemicals.
- No food or drinks are to be in the lab.
- It is not advisable to work alone in the lab.
- When working with exceptionally hazardous chemicals or performing new tasks another worker should be aware of your presence in the laboratory.
- Workers are to wear personal protective equipment (PPE) that fits that task they are performing. Proper PPE is described in section 8.
- When working with chemicals or setups that can be explosive workers should use a blast shield or a face shield or should work in a hood where the sash or sliding glass doors can be placed in such a way as to block explosions.
- Do not pipette by mouth.

- Label chemicals or solutions that have been transferred to another bottle or used for mixing purposes. Solutions should be labeled with their concentrations (when appropriate), name/initials of the individual that made the solution and the date.
- Use only approved containers for transportation of chemicals.
- When lifting heavy boxes or equipment, do not lift using the back but by bending at the knees.
- Before any students are to begin work in a teaching laboratory, they are to read and sign a safety agreement each semester designed by the instructor and/or CHO which outlines the following:
 - General expectations of student behavior.
 - Appropriate PPE.
 - Location and use of the safety equipment in the room.
 - Location of the evacuation plan and DACC emergency numbers.
 - How to handle an emergency.
 - Date and signature of the student.

A sample safety agreement used for the DACC lab courses is included in the Appendix.

7.2 Independent Student Work in Labs

Some courses allow students to work without the instructor present in the lab room in order to study or prepare projects. For these courses, the following guidelines are in place:

1. The lab should be monitored during student use. Lab monitors could be:
 - a. The instructor.
 - b. Another instructor who understands the course or knows what the students should be doing or not doing.
 - c. The Science Lab Assistant.
 - d. The Chemical Hygiene Officer.
2. The Science Lab Assistant must be informed of when students will be working in the lab and the individual monitoring the lab.
3. Lab monitors should be aware of what students should and should not be doing during their lab use. For example, if anatomy students are studying, the monitor should know if the cadaver should be in use.
4. Safety guidelines for the workers should be posted in the lab. A copy of each lab's safety guidelines are kept with the Science Lab Assistant and the Chemical Hygiene Officer.
5. When students are finished working, they should clean up any materials used.
6. All general safety guidelines and the guidelines provided by the course's instructor should be followed by the students using the lab. If students do not follow these guidelines, they may be asked to leave the lab or no longer be able to have independent lab time.

7.3 Fume Hoods and Ventilation

Fume hoods and ventilation should be used when working with chemicals that give off harmful vapors, dust or need to be contained. The fume hoods and ventilation should be checked on a regular basis for proper flow and working parts. Records of their upkeep are kept with the DACC Director of Maintenance and Facilities.

- The sash or sliding glass doors should be kept shut when the ventilation is on for maximum ventilation.
- When working with fume hoods, the sash or doors should be open only as far as necessary for the job. Follow the given restrictions for the sash height. Working above the sash height restriction dramatically cuts down on the effectiveness of the ventilation system.
- A worker's head should not be in the hood while the hood is in use.

7.4 Special Hazards

7.4.1 Highly Hazardous Chemicals

OSHA has compiled a list of highly hazardous, toxic and reactive chemicals which are those chemicals that present a catastrophic event hazard at or above the threshold quantity (29 CFR 1910.119 App A, Subpart H). The following information should be reviewed and understood before use of these chemicals.

- When using these chemicals, wear gloves, disposable clothing (when possible) and use a fume hood or ventilation source.
- Work only with small amounts of these chemicals.
- Plan ahead when working with these chemicals, as to minimize the amount of time spent with the chemical.
- Return the chemical to its proper storage location as soon as you have finished working with it.
- Replace these chemicals with acceptable substitutes when possible.
- Do not store or house unnecessary amounts of these chemicals.
- Highly hazardous chemicals should be stored in a hood or ventilated cabinet.

If the worker is uncertain as to the nature of the chemical they are using, they should consult the Material Safety Data Sheet* (MSDS) or Safety Data Sheet (SDS)* for hazard and exposure information. MSDSs can be found online at the SIRI MSDS website (<http://hazard.com/msds/>), from chemical manufacturers or in MM275.

*Material Safety Data Sheets are being replaced by Safety Data Sheets or SDSs which contain sixteen sections of information. The breakdown of the SDS may be found at www.osha.gov.

7.4.2 Anatomy and Physiology Cadavers

The following preservatives are used in our Anatomy and Physiology courses (MM281). Contact exposure is limited by the use of splash resistant goggles and nitrile gloves. Wearing a mask is NOT advised due to possible concentration of fumes.

Preserved specimens are maintained using one of three solutions:

1. Cadaver Fluid is a Phenol/Alcohol solution with the following composition: Water- 30300g, Ethyl Alcohol- 7475g, Phenol- 500g (1.3% Phenol by mass; 1.25% w/v); see MSDS Sheets
2. Eyes have been preserved in formalin (See SDS), rinsed thoroughly, and placed in a formaldehyde-free, non-toxic holding fluid called Carosafe (See SDS).
3. Hearts and brains have first been preserved in a dilute formalin solution, thoroughly rinsed, and placed in a solution called Wardsafe which “seeks out and binds to free formaldehyde in formalin-containing fluids that may seep from specimens, effectively REDUCING the already minimal residual level. Independent laboratory tests have determined WARDsafe is non-sensitizing to the skin. It is not a primary skin or eye irritant in accordance with Consumer Product Safety Commission.”

7.4.2.1 Cadaver/ Preserved Specimen Use Rules:

1. Absolutely NO food or drink (including gum/candy) is allowed in this laboratory!
2. Students must wear chemical splash goggles and gloves.
3. The ventilation system should be on when working with the cadavers.
4. Use towels moistened with preservative to cover areas of the cadavers which are not being studied.
5. Rewet the towels at the end of each lab either by dipping/pouring or spraying according to your instructor’s policy. Overlap the flaps of the body bags to minimize air contact.
6. Follow instructor’s direction regarding storing supplies and disposal of preserved specimens.
7. Remove gloves (trash) and wash hands with soap before leaving lab.

7.4.2.2 “Cadaver Fluid” Preparation

All personnel must use and wear the following PPE from the initial collection of chemicals to the final disposal of the empty containers: Long sleeve lab coat, rubberized lab apron, chemical-splash goggles, and extended length neoprene gloves. Additional safety equipment required during mixing: face shield which covers the entire face and neck area. “Team lift” the solution carboy to a lower lab counter near a fume hood outlet to eliminate the need for a stepstool and reduce vapor exposure.

Reagents:

500 g Phenol (Fisher 911-500)

9.5L Ethyl Alcohol (Fisher A405 20) [~2.5 gallons]

30L Distilled Water [~8 gallons]

Directions:

Place the unopened container of Phenol in a large metal beaker. Add water to the level of the Phenol. Heat on a hotplate until the Phenol melts (Melting Point: 43°C); remove from heat and leave in water to stay warm.

Use a large cart with appropriate secondary containment to transport reagents to MMC281. Turn on all room ventilation. Carefully pour the melted Phenol into the carboy using a large funnel. Sequentially rinse the phenol jar and funnel with 4 liters of alcohol. Replace the jar lid and discard in the trash. Add the remaining alcohol and the distilled water. Tightly close the carboy and TEAM LIFT it to the countertop. Leave the ventilation fans on for 1 hour or until all odor has dissipated. After containers are properly stored wash gloves, then hands and face, with SOAPY water and rinse thoroughly. Wash the face shields and goggles in soapy water before returning them to their storage area.

7.4.3 Radiological Technology

The following sections are provided to students in the radiological technology courses as part of their program safety as designed by the Medical Imaging Director. A student form can be found in the Appendix acknowledging their receipt and comprehension of the course policies.

7.4.3.1 Darkroom Operation

Always turn on the exhaust fan and safelights when working in the darkroom.

7.4.3.2 Radiation Safety

Radiation safety is an integral part of the medical imaging profession. Therefore, it is imperative that students be aware of radiation protection rules that must be followed by all personnel. These rules were developed by the National Council on Radiation Protection (NCRP) and are accepted by all regulatory agencies. The radiation protection rules allow Medical Radiographers, students, and radiologists to share the responsibility to keep occupational and non-occupational absorbed doses below their allowable maximum levels. This safeguard can be achieved through the employment of proper radiation control procedures.

1. The ALARA (As Low As Reasonably Achievable) concept will be followed. A student is expected to exercise sound radiation protection practices at all times. At no time should a student participate in a procedure that exhibits unsafe protection practices. Danville Area Community College will provide optically stimulated luminescent dosimeters (OSLs) to all students for laboratory and clinical education.

Radiation Protection Rules Governed By ALARA

1. Do not make radiographic exposures when individuals are in an unprotected beam path area. Always stand behind the lead barrier in the control booth when making an exposure.
2. Always wear the OSL when participating in labs or clinicals.
3. The OSL is to be worn at the neck level and outside the lead apron.
4. Never leave the OSL in an exposure room.
5. Never wear the OSL if you are having medical or dental radiographs taken of yourself.
6. Never make an exposure while the door to the radiographic room is open.
7. Never enter a radiography room without knocking to be sure an exposure is not in progress.
8. The student is responsible for controlled storage of the OSL.
9. If an OSL is lost or damaged, report it immediately to the Program Director. The student is responsible for replacement expenses incurred.
10. Report any inadvertent exposure or other irregular radiation incident to the Program Director.
11. Danville Area Community College will maintain a radiation exposure report on all Radiologic Technology students indefinitely.
12. If any OSL reading reaches 100 mrem (1mSv) in any given bi-monthly reporting period, the Program Director will initiate an investigation into the cause and, if necessary, implement steps to prevent a re-occurrence.

7.4.4 Biology Courses—Blood Glucose Testing

Needles are disposed in sharp safe containers and given to security for removal from the department on scheduled days. The only exposure students have during skills lab to biological fluids is their own blood during Blood glucose testing. Students do not give each other injections or test other students' blood. Any needle stick injuries would be with sterile needles (sharps) or needles (sharps) contaminated with the students own blood. Any blood spills during the Glucose testing are cleaned immediately with a bleach solution and the students puncture wound cleansed with water and antiseptic hand soap and covered with a bandaid. An Incident Report should be filed within 24 hours (See section 13.1.3).

8 Personal Protective Equipment

In general, Personal Protective Equipment (PPE) includes:

- Clothing that covers a majority of the skin to protect from spills. Shorts, cropped pants, skirts or shirts that are too short or low-cut should not be worn when working with

hazardous chemicals. Clothing should be without large holes and should not be baggy to avoid snagging on equipment.

- Closed-toe shoes that cover the tops of the feet.
- Gloves, such as disposable nitrile gloves, that cover the wrists. Gloves should be placed in any room where chemicals are used.
- Aprons or lab coats may be worn when more coverage than just your clothes is necessary.
- Long hair should be tied back.
- Splash goggles or safety glasses to protect the eyes. Eyewear should be worn when working with chemicals. Splash goggles should be considered, especially when working with concentrated acids or any harmful chemical that presents a splash hazard. Splash goggles should be ANSI approved.

It is the responsibility of the individual to determine what PPE is necessary for the specific task they are performing.

9 Laboratory Equipment

9.1 Glassware

- Before using, inspect the glassware for cracks or defects to prevent explosions or breaking while heating or using under a vacuum.
- Cracked glassware should be disposed of in a proper receptacle, such as a designated broken glass box. Broken glass boxes may be found in MM273 and MM275.
- Fire polishing should be used on cut glassware like tubing or rods.
- Glassware should be cleaned after use. In general, soap and water or a glassware cleaner should be sufficient for cleanliness. Cleaning solutions, such as alcoholic potassium hydroxide (KOH) or Aqua Regia, should only be used by individuals with the understanding of their proper use and safety hazards.
- Ground glass joints should be greased to prevent sticking or freezing of the joints.
 - Frozen or stuck joints may be loosened by gentle tapping, twisting or heating of the joints.
 - Joints may also be run under hot water to expand the glassware.
- When possible, setups using vacuums, such as a vacuum distillation, should be either shielded or performed in a hood in case of explosion.

9.2 Instrument Care

Instrument care should be performed as suggested in the manuals provided with each instrument. Individuals using the instruments should be aware of proper operating procedures prior to their use. Manuals are to be kept either with the instrument in MM 273A or in a file in the prep area, MM275. In general, instruments should be kept in a dry and, if possible, temperature-controlled

environment. Electrical supplies should be away from water sources and grounded. It may be preferable, in some cases, to have a backup power supply for certain instruments.

9.2.1 Balances

- Balances should be kept free of chemical debris as much as possible.
- Spills on or around balances are to be cleaned up quickly and any excess chemicals should be disposed of in appropriately labeled waste containers.
- Regular calibration and cleaning of the balance should be done.
- Shutting off the display can assist in saving electricity when the balances are not in use.

9.2.2 Melting Point Apparatus

- Used melting point tubes should not be left in the melting point apparatus.
- If mercury thermometers are used for temperature monitoring, a mercury spill kit is to be kept nearby in case the thermometer breaks. When able, replace mercury thermometers with a less hazardous thermometer, such as an alcohol thermometer.
- Used melting point tubes should not be disposed of with regular trash. They should be collected, their contents noted and placed in a container for waste pickup.

9.2.3 General

- Inspect instruments before and after use, taking note of any unusual aspects of the instruments.
- An instrument with a frayed cord should not be used until the cord is fixed.
- Keep power sources away from water or water sources.
- Do not leave instruments unattended when in use, especially if they involve an open flame, exceptionally high temperatures, boiling substances or are under vacuum.
- Students should be supervised when using instruments and should be properly informed as to the use and safety hazards of the instruments.
- Clean up any spills near instruments as soon as possible.

10 Safety Equipment

10.1 Eyewash and Safety Shower Stations

Eyewash and safety shower stations should be marked with the appropriate signs and regularly maintained. They should be located on the same floor as areas designated for use of hazardous chemicals and should be easily reached without obstructions. Regular maintenance includes flushing the eyewash and safety shower to check water flow and color. The eyewash station should be checked weekly and the safety shower at least once a month. Anyone who works with hazardous chemicals should be trained in the use of the eyewash and safety shower.

For the eyewash:

- Turn on the eyewash.
- With the eyelids held out of the way, insert eyes down into the water.
- The eyes should be rinsed for at least 15 minutes.
- If necessary, contact emergency medical response or seek medical attention.
- An Incident Report should be filed as soon as possible.

For the safety shower:

- Before entering the safety shower, remove any affected clothing. A fire blanket is a good way to shield someone while in the safety shower for modesty.
- Turn on the safety shower and rinse in the shower for at least 15 minutes.
- Depending on the nature of the spill and chemicals, affected clothing should be considered hazardous waste and disposed of properly.
- If necessary, contact emergency medical response or seek medical attention.
- An Incident Report should be filed as soon as possible.

10.2 Fire Extinguishers and Fire Blankets

Fire extinguishers and fire blankets may be available. They should be in an unobstructed location and inspected regularly to ensure they are in proper working condition.

10.3 Spill Kits

- Spill kits should be kept in an easily accessible location.
- Spill kits are to be properly labeled.
- Any individual working with hazardous chemicals should be trained in the proper use of spill kits.
- If possible, spill kits are to be refilled or replaced as soon as they are used up.
- It may be advisable to keep absorbent mats near spill kits to help contain spills.
- All spill materials should be disposed of properly once used. See the CHO for assistance in disposing of used spill materials.

Detailed use of the spill kits is addressed below in section 13.2.

11 Chemical Management

Proper chemical management is the result of the combined efforts of those individuals using the chemicals. The following sections should be reviewed and understood by those using chemicals in an effort to maintain a clean laboratory, prevent spills or dangerous chemical conditions caused by old or misused chemicals.

11.1 Chemical Inventory

The chemical inventory is a working document that is to be, at the very least, annually reviewed for updates. A copy of the chemical inventory is to be kept in the chemical store room and with the CHO. The chemical inventory is a list of the following:

- Name of the chemical (may include synonyms).
- Approximate amount of the chemical.
- Storage location.
- Special health, use or disposal considerations.

11.2 Chemical Storage

Chemical storage is done by following the Flinn Scientific system which groups chemicals in the following way:

- Inorganics:
 - Metals (Inorganic 1)—Flammable metals are kept in a designated flammables cabinet.
 - Halides, Sulfates, Phosphates, Acetates, etc. (Inorganic 2)
 - Nitrates (Inorganic 3)
 - Hydroxides, Oxides (Inorganic 4)
 - Sulfides (Inorganic 5)
 - Chlorates, Perchlorates (Inorganic 6)
 - Arsenates (Inorganic 7)
 - Borates, Chromates (Inorganic 8)
 - Acids (Inorganic 9)—Kept separately from other chemicals in a dedicated acid cabinet. Nitric acid is stored away separately.
 - Sulfur, Phosphorus (Inorganic 10)
- Organics:
 - Organic acids (Organic 1)
 - Alcohols, glycols, sugars, amines, amides, imines, imides (Organic 2)
 - Hydrocarbons, oils, esters, aldehydes (Organic 3)
 - Ethers, Ketones, Ketenes, Halogenated hydrocarbons, ethylene oxide (Organic 4)
 - Epoxy compounds, isocyanates (Organic 5)
 - Peroxides, azides, hydroperoxides (Organic 6)
 - Sulfides, polysulfides (Organic 7)
 - Phenols, cresols (Organic 8)
 - Dyes, stains, indicators (Organic 9)
- Flammables:
 - Hydrocarbons, ketones, etc. (Flammables 1)
 - Alcohols (Flammables 2)
 - Large bottles (Flammables 3—Yellow Flammable cabinet in acid closet)

Upon receipt of chemicals, they are to be labeled with the appropriate category as defined above (I-1 for metals, I-10 for sulfur or phosphorus, etc.) and the date. They are then added to the chemical inventory. The shelves are all labeled individually with a shelf number and the chemical category.

11.3 Safety Data Sheets (SDS) or Material Safety Data Sheets (MSDS)

Safety Data Sheets (SDS) are kept in MM275 for the chemicals we receive and are also available online. These sheets are designed to give information on the names, properties, hazards, safe handling and disposal of chemicals and include sixteen sections of information on chemicals and their proper handling. They are also available from many sources, including chemical manufacturers. The Director of Administrative Services stores hardcopies of our SDS in case of an emergency.

SDS replaces the previous Material Safety Data Sheets (MSDS) to ensure alignment with the Globally Harmonized System of Classification and Labeling Chemicals (GHS) set forth by the United Nations.

11.4 Chemical Disposal

11.4.1 Storage and Labeling of Chemical Waste

It is important that safe laboratory practices include the reduction of hazardous waste, in addition to the proper disposal of waste. When equipment, experiments or instruments require hazardous materials, they should be evaluated for their necessity in order to help reduce the production and storage of chemical waste.

Procedures for the storage and labeling of chemical waste are as follows:

1. The Chemical Inventory is physically inspected at least once a year (generally during the summer session) to see if there are chemicals that: 1) are no longer used; 2) are showing signs of deterioration; 3) have labels that are deteriorating; or 4) are unnecessarily toxic; and/or, 5) were missed in previous purges.
2. Chemicals to be removed from the inventory are evaluated for toxicity. The Flinn catalog is the prime reference for chemicals that may be discarded in the trash or in dilute form via the city sewer. All other chemicals are sorted by *category (oxidizer, acid, etc.)*, added to the Hazardous Materials (Haz Mat) inventory, and placed in a bin in a locked closet until collection by a licensed Haz Mat disposal firm. At the time of placement in the disposal bin, the Chemical Inventory is amended to read “Disposal Pending.”

11.4.2 Waste Disposal and Pickup

Bids for waste disposal and pickup come from licensed Haz Mat firms, such as TRADEBE, Safety-Kleen, Bodine Environmentals, and Environmental Marketing Services, LLC of South Carolina.

On the day of disposal, all chemicals are grouped by kind, and checked against the disposal list as they are set out for pickup. Persons participating must use the following PPE:

1. Rubberized apron
2. Nitrile gloves, extended cuff
3. Chemical splash goggles/ safety glasses
4. Lab coat

Once the disposal company is on-site, involvement of DACC employees ceases (wash hands, put away equipment, etc.). When all chemicals are properly packed the Science Lab Assistant signs off on the final list and ascertains that all chemicals have been packed and loaded before the disposal team leaves. At this point, the Chemical Inventory is edited, striking through the chemicals which have been removed and adding a notation with the date and name of the disposal company. When the chemical inventory is reviewed, a new inventory is then printed to reflect any updates due to ordering, use or chemical disposal.

12 Housekeeping

- Keep lab areas clean and free from clutter. Clean up any spills or excess materials quickly.
- Doorways and exits should be clear and easily accessible. Do not block or use for storage.
- Floors should be kept dry. Any spills or water should be cleaned up immediately.
- Safety equipment, utility controls and exits should be easily accessible and kept free from clutter and blockage.
- Broken glass boxes should not have glass sticking out of the opening. At this point they should be considered full, and replaced with a new broken glass box.

13 Emergency Procedures for Accidents and Spills

13.1 DACC Policies and Information

The following policies and information are provided to aid workers in the appropriate handling of emergency procedures. Workers should remain calm during an emergency. If a spill or fire occurs, know that as a worker it is your responsibility to inform the proper personnel of the incident, contain the spill or fire by closing the door and evacuating those nearby in a calm and organized manner. While knowing the use of safety equipment is important, workers are not

required to fight a fire or clean up a large spill due to the fact that you may catch yourself unawares and end up unable to escape or unnecessarily putting yourself in harm's way.

13.1.1 Campus Emergency Numbers

****When calling a campus number on a campus phone, use only the last four digits.**

Emergency Responders	9-911 (or 911 from a cell phone)
DACC Safety & Security	443-8888
Math & Sciences Division Office	443-8806 (Dean) 443-8805 (Office Specialist)
Maintenance	443-8832
Director of Administrative Services	443-8831

13.1.2 Campus Emergency Procedures

As emergencies are always a possibility, it is best to be prepared before it happens. Spend time before each semester to become familiar with the areas you use. Know the evacuation route and where to take shelter in case of an emergency. If an emergency occurs, your best outcomes will result from you remaining calm. If you find yourself in charge of an area, then delegate duties. Clearly communicate your needs using plain language and trust others to do their part. Follow the procedures below for injury or spills.

13.1.2.1 Injury Emergency

If an incident involves serious injury,

1. Call 9-911.
2. Call Campus Security at 443-8888. If possible, provide the Security Guard with the following information:
 - a. Location of incident;
 - b. Name of person;
 - c. Name, location and phone number of person(s) to be notified; and
 - d. Description of the injury or illness.
3. Call the Math & Science Division Office 443-8805 or 443-8806.
4. After the ambulance has transported the person from the scene, complete the Illness, Injury & Accident Report found on the Employee Resources page in SharePoint. This form must be submitted within 24 hours of the incident.

If an accident is clearly a minor injury, call Security 443-8888. An Injury & Accident Report found on the Employee Resources page in SharePoint must be completed by the involved parties within 24 hours.

13.1.2.2 Hazardous Material Spills—Exposure

Pre-planning is essential when working with chemicals and other hazardous materials. Know what substances are in your work area and the dangers they present.

If the release is life threatening,

1. Call 9-911.
2. Call DACC Security at 443-8888. If possible, provide the Security Guard with the following information:
 - a. Location and type of spill;
 - b. Injuries;
 - c. Approximate amount of material involved;
 - d. Any identifiable reaction; and
 - e. Who was in contact with the spilled substance.
3. Call the Math & Science Division Office 443-8805 or 443-8806.
4. Equipment or processes containing hazardous materials should be halted and the area evacuated. Close the doors to contain the situation until trained responders arrive or you have knowledge that opening the doors and windows to ventilate area is appropriate. If a determination has been made to contain the area, contact maintenance at 443-8832 to shut off the ventilation system.
5. Account for everyone in the room and compile a list of all individuals who might have been contaminated by the spill.
6. If direct contact is made with the spilled substance, immediately remove contaminated clothing. Use a safety shower to flush the point of contact with plenty of water for at least 15 minutes.

Remember, in all cases of emergencies, you need to control the flow of information. Only the President and his/her designee are authorized to make any statements to the news media concerning facts relating to an emergency.

13.1.3 Incident Reports

All injuries and hazardous material spills are to be reported via an Illness, Injury & Accident Report found on the Employee Resources page in SharePoint. The report should be completed within 24 hours of the incident. Online versions of the report will be automatically submitted to the Director of Administrative Services, Security, Human Resources and the Dean's Office. If you use a hard copy of the form, please turn the form into the Division Office. The Division Office Specialist will ensure the proper copies are sent to other DACC offices.

13.2 Chemical Spill Kits

Chemical spill kits are kept in the chemistry lab, MM273, and in the chemical prep area, MM275. Contents of the kits may include the following:

- Acid neutralizer and absorbent, “SpillX-A”
- Base neutralizer and absorbent, “SpillX-C”
- Solvent absorbent, “SpillX-S”

Absorbents should be applied around the spill to contain and then as described on the bottle for the remainder of cleanup. Absorbent mats may also be used to help contain spills. Be careful using brooms with flammable liquids, as their sparking may cause a fire.

Spills should be cleaned immediately. In the event that the chemical spilled has a strong odor or toxic fumes, the room should be evacuated and the door shut. Do not try to clean up a spill with a strong odor, as it may do more harm to you than good. Notify the CHO for instructions as to how to deal with the spill. If the substance is too dangerous for the equipment we have, call 911 for the Fire Department to assist with cleanup.

13.3 Mercury Spill Kits

Mercury and its vapor are harmful substances that are found in a variety of equipment, but are mostly found in DACC labs in some thermometers and barometers. It is important that we try to minimize equipment that uses mercury to prevent spills. Where possible, mercury thermometers should be replaced with non-mercury thermometers. OSHA regulations state that

- Mercury exposure should not exceed more than an 8-hour time-weighted-average limit of 1 mg / 10 M³.
- DACC must provide appropriate PPE for cleaning up mercury spills, which includes gloves and a mask.
- No employee may consume food or drink where mercury has been spilt.

Mercury spill kits are kept in the prep area in MM275. Workers should wear gloves and a mask when cleaning up mercury spills. Follow the instructions on the kit. The final mercury waste should be kept in a sealable container and labeled for the contents and disposal.

13.4 First Aid Kits

First aid kits are found in MM275 and the Mary Miller Division Office. It is advised that students requiring first aid seek third party medical assistance by dialing 911 (9-911 from a campus phone) and the DACC security (8888 from a campus phone). An Incident Report should be filed within 24 hours.

14 Training

14.1 Faculty, Staff and Student Workers

Faculty, staff and student workers working in labs or the prep lab area are to be trained at the start of their employment by the CHO or Division Dean with an annual update. The training includes the following:

- Location and contents of the CHP.
- Use of and location of safety showers, eyewash stations, fire extinguishers and other safety equipment.
- Proper procedures for emergencies and spills.
- PPE and other protective measures for working safely with chemicals.
- Location and use of Safety Data Sheets (SDS) or Material Safety Data Sheets (MSDS).
- The chemical inventory and the storage and disposal of chemicals.
- General lab practices and hygiene.

Upon completion of the training or annual renewal, the workers are to fill out the DACC Faculty, Staff and Student Worker Safety Training Certificate (See Appendix). The certificates are to be kept on file with Human Resources and replaced with the updated form after annual renewal. The CHO keeps a copy of these records, as well.

Student workers are not to work unsupervised in the lab and are to be advised of any particular safety precautions for their specific tasks by the DACC employee with which they work.

14.2 Teaching Laboratory Policies

Due to the variety of courses offered at DACC, each laboratory instructor is responsible for educating their students on the appropriate safety policies for their specific lab, as well as DACC emergency policies. All chemistry and biology lab (or any lab using hazardous chemicals) instructors must discuss these general policies with their students and have their students sign a form at the beginning of their laboratory course saying they have understood and agree to follow all safety policies. Students' inability to adhere to these policies will result in their removal from lab by their instructors, either for a lab period or from the course entirely. Signed student forms are to be kept on file with the instructor of that course. Copies of the general form are found in the Appendix.

The DACC General Student Safety Agreement is the minimum for the labs, and instructors are advised to tailor the form and their student safety discussion to their particular course. Instructors should contact the CHO if they would like assistance in designing lab safety agreements or policies. Lab courses taught in the Radiological Technology and Nursing Program have their own forms and do not need to use the General Safety Agreement for their courses.

14.2.1 General Teaching Lab Policies

General teaching lab policies include the following:

- Students may not work in labs without the knowledge of their instructors.
- At the beginning of a course, students are provided with the appropriate safety information for their course.
- No food or drinks are allowed in the lab.

- Gloves are to be removed before exiting the lab.
- Students should be made aware of the proper procedures for using equipment in their area.
- Students are to inform their instructors of any health issues and disabilities that may interfere with their ability to successfully complete the lab course. Pregnant students should inform their instructor to ensure a safe working environment.
- Students are to be informed of the proper use and location of the safety equipment, as well as the fire and tornado procedures.
- Students are to be informed of the proper emergency procedures for injuries and spills.
- Students are to be prepared for lab, which includes wearing the appropriate PPE and reading their experimental procedure before coming to lab.

14.2.2 DACC Chemistry Labs

DACC chemistry labs require a more stringent student safety agreement, which is located in the Appendix. Students are to be informed of the use of SDS and how to appropriately handle and dispose of the chemicals used each lab session. Chemistry students are not allowed in the lab unless the chemistry instructor or other DACC employee is present.

14.2.3 DACC Biology Labs

Several biology courses, some with unique hazards, are offered at DACC. Special information concerning their safety hazards and agreements can be found in section 7.4 of this CHP and the Appendix.

15 Laboratory Design and Ventilation

Each lab is designed for the experiments and procedures performed. The ventilation should be maintained and regularly checked by the Maintenance and Facilities Department. If the ventilation is unsatisfactory, then work with hazardous chemicals requiring ventilation should be suspended until the ventilation is fixed. Report issues with ventilation to Maintenance immediately. Workers should be trained in the appropriate use of the ventilation system and fume hoods.

16 Exposure Monitoring

Exposure to OSHA regulated substances is not be in excess of those designated by the permissible exposure limits (PELs) outlined in OSHA standard 29 CFR 1910 Subpart Z. The CHO is responsible for determining if monitoring is necessary. Regular monitoring is unnecessary if the ventilation/fume hoods are working and being used properly; workers are using appropriate PPE; and workers are performing their tasks safely and with correct chemical hygiene.

17 Compressed Gas Safety

Before workers begin using compressed gas cylinders, they are to be informed as to the proper operation, storage and safety information for those cylinders. Compressed gas cylinders should be inspected on a regular basis for rust on the cylinder, gas leaks, and proper working conditions. A record of the inspections should be kept. As stated by OSHA standard 1910.101 compressed gas cylinders should have a pressure relief system in place, such as a regulator. Compressed gas cylinders are to be stored so that they are appropriately supported to prevent falling over and in an area away from open flames. Gas cylinders should only be moved with a cart or apparatus that includes a support system and so that the cylinder cannot tip or fall during transportation.

17.1 Operation

- Before beginning use of the gas cylinders, check the connections of the tank to make sure they are tight. Do not over tighten the connections to assist in the prevention of excessive wear and tear.
- Open the gas valve slowly (if no regulator is attached, then open the cylinder in a direction pointing away from the face).
- Adjust the regulator to the appropriate pressure.
- Check the valves for leaks with soapy water. The formation of bubbles is a sign that the connections are not secure. Shut off the gas before tightening any of the connections.

17.2 Additional Information

For more information on operation and safety for compressed gas cylinders, see the OSHA website or the Compressed Gas Association Pamphlet P-1-1965.

18 Medical Consultation and Examination

Any individual working with hazardous chemicals at DACC has the right to a medical consultation and/or examination of a condition resulting from their work with the hazardous chemicals by a licensed physician. The right to consultation and examination includes any condition resulting from a spill, leak, explosion or other incident. The worker may receive this medical consultation or examination without charge, at a time and place that are reasonable, and without a deduction in their pay. During the medical consultation and/or examination the worker or DACC should provide information about the hazardous chemical, the events surrounding the incident and any symptoms the worker experienced due to the incident. DACC incident forms can be found online on the Employee Resources page in SharePoint.

19 Appendix—Forms

19.1 Form #1—Faculty, Staff and Student Worker Safety Training Certificate

DACC Faculty, Staff and Student Worker Safety Training Certificate

I, _____ (print name), have received the appropriate safety training to work in the DACC labs with hazardous chemicals and materials. I have read and understood the Chemical Hygiene Plan (CHP) and know where I may access the CHP. I understand that safety is an ongoing process and the best way to be prepared for an accident is to act in a preventative manner. I know the locations of and use of the safety equipment and have been informed how to act in case of an emergency. I agree to always act in the best interest of others working around me and myself in order to keep DACC a safe and healthy work environment.

Date of Safety Training: _____ (mm/dd/yyyy)

Signature of Employee: _____

Signature of Chemical Hygiene Officer: _____

This training certificate is good for one year and is to be renewed annually.

Any questions or comments should be directed to your Chemical Hygiene Officer.

19.2 Form #2—DACC General Student Safety Agreement

DACC General Student Safety Agreement

Safety Guidelines:

1. No horseplay in the lab.
2. No food or drinks are allowed in the lab.
3. Do not pipette by mouth.
4. Use the wafting technique when smelling chemicals.
5. Do not walk away from a lit Bunsen burner and turn the burner off when it is not in use.
6. Tie back long hair when working with Bunsen burners.
7. Locate and understand the use of the safety equipment, such as the fire extinguisher, fire alarm, safety shower and eyewash station.
8. Report any spills or accidents to your instructor immediately. Follow their instructions for the proper cleanup or procedures.
9. Broken glass should be disposed of in the broken glass box. Do not place broken glass in the trashcans.
10. Wear appropriate personal protective equipment as directed by your instructor. Examples of personal protective equipment include clothing that is not baggy or overly torn, shoes that cover the feet, gloves and safety goggles.
11. Gloves should be removed when leaving the lab.
12. Do not dispose of chemicals down the drain unless instructed to do so. Place chemical waste in the correct waste container.
13. Read chemical labels carefully. Always label a container clearly.
14. Be prepared for lab by reading the experimental procedure before coming to lab. Always read and follow the experimental procedures. Ask your instructor for clarification when you are uncertain about your experiment.
15. Follow all instructions and guidelines given by your instructor.

I, _____ (print name), have read, understand and agree to follow the general safety policies and guidelines outlined here and any other instructions, written or verbal, from my instructor.

Student Signature

Date

Course

19.3 Form #3—Chemistry Student Safety Agreement

SAFETY RULES FOR DACC CHEMISTRY LABS

The following rules are designed for your safety in the laboratory. The course professor has complete authority for enforcement of these rules and any other procedures, as is seen fit to ensure safe practices in carrying out the laboratory work. Violations of these rules are grounds for expulsion from the laboratory area, and may be cause for failure of the course. You must receive a passing grade for the laboratory portion of the class in order to pass the course.

- 1) **Be properly prepared to do the experiment before you enter the lab.** Read the instructions in advance and understand what you are being asked to do. Be aware of all the potential hazards of the experiment ahead of time.
- 2) **Perform all experiments as directed by the lab instructions and your professor.** Do not do anything that is not part of your instructions, unless your laboratory professor gives you approval. If any part of the experiment is unclear to you, stop to read the instructions again, then ask your professor for help before continuing.
- 3) **Never work without the supervision of your professor.**
- 4) **Act appropriately at all times.** No horseplay or carelessness is permitted in the lab. You are responsible for the safety of yourself and your classmates.
- 5) **Always be prepared for an accident.** Be ready for the unexpected at all times, even in apparently safe situations. Learn the locations and operation of the emergency equipment. This includes the eyewash, safety shower, fire extinguisher, fire blanket, and sinks. First aid protocol for acid or base in the eyes is to wash with water using the eyewash station for a minimum of 15 minutes. First aid protocol for acid or base on skin or clothes is to wash thoroughly with water, or emergency shower if appropriate. Removal of contaminated clothing may be necessary. Washing with water should be followed by application of a solution of sodium bicarbonate for acid burns or a solution of boric acid for base burns.
- 6) **Report all accidents, injuries, explosions, or fires immediately to your professor.** The professor will decide in all cases whether the extent of an injury is serious enough to warrant inspection and treatment by a third party. In case of an emergency, call either 911 or the DACC Emergency number at 217-443-8888.
- 7) **Read chemical labels carefully.** Read them both before and after use. Review MSDS's for any needed information about the chemicals that will be used. Treat all chemicals with the respect they deserve.
- 8) **Wear appropriate protective equipment.** ANSI approved goggles should be worn at all times. Goggles must be worn in the appropriate manner rather than on your forehead or around your neck, as one of the main reasons for their use is chemical splash protection. Therefore, safety glasses are not permitted for any student in the laboratory. Nitrile gloves will be provided for student protection. Gloves are required in organic chemistry labs and recommended in all other labs.
- 9) **Wear appropriate clothing in the lab.** Clothing and shoes should be worn so that your skin is covered from shoulders to toes. No sandals, flip-flops or shoes that expose the top of feet are allowed. Only pants without large holes may be worn. No

shorts, capris or cropped pants. Clothing should not be loose and baggy, especially if you are wearing long sleeves.

- 10) **Confine long hair.** Hair can catch on fire while using open flames or can touch chemicals if not tied back.
- 11) **Never taste a chemical or place your nose directly above a chemical container.** This includes a ban of mouth suction to fill pipettes. Check odors by gently wafting chemical vapors toward your nose with your hand.
- 12) **Use the fume hoods when necessary.** All operations in which noxious, poisonous, or otherwise harmful gases are used or produced must be carried out with proper ventilation.
- 13) **Never eat or drink in the laboratory.** Do not bring any food items into the laboratory classroom. This includes candy, cough drops, and gum. Smoking and chewing tobacco are also not permitted.
- 14) **Avoid all chemical contamination.** Never return unused reagents to the reagent bottle. Be careful to take only what you actually need. It is easier and less expensive to go back for more reagent rather than disposing of excess reagent.
- 15) **Dispose of chemicals properly.** Containers will be available for waste chemicals and for contaminated paper towels and gloves. Although you should not dispose of anything incorrectly, you should be mindful that chemical waste disposal is costly.
- 16) **Clean up all spills.** This includes water. Broken glass goes in special receptacles and not in trash cans. Clean up immediately while exercising the appropriate care to protect yourself from skin contact with the substance. Clean off your lab space before leaving the laboratory.
- 17) **Never take chemicals, supplies, or equipment out of the laboratory.** Chemicals may only be taken to the dispensary area for refilling or replacing purposes. When any container is moved over any distance, it must be capped, corked, parafilm, etc. in order to prevent spills.
- 18) **Special health consideration.** If you are aware that you have a special health condition such as asthma, pregnancy, or any other health concerns, you may want to consult your doctor before taking chemistry lab. Please feel free to discuss any questions or concerns with your professor.
- 19) **You must sign a copy of this Safety Sheet before you may work in the lab.** Direct any questions toward your professor.

I, _____ have read, understand, and agree to follow these safety rules and procedures. I agree to abide by any additional instructions, whether written or verbal, provided by my instructor.

Student Signature

Date

Course

19.4 Form #4—Radiological Technology Statement of Comprehension

STATEMENT OF COMPREHENSION OF RADIOLOGIC TECHNOLOGY PROGRAM HANDBOOK

Student Name: _____

My signature below attests to the fact that I have read and have had explained to me the policies and guidelines contained within the Radiologic Technology Program Handbook and that I allow DACC to release pertinent demographic, academic and medical history information about me to the appropriate personnel at the clinical sites.

I also acknowledge that I am responsible for reading all the information and adhering to the rules, policies, and guidelines contained in this Handbook.

Student's Signature

Date

19.5 Form #5—Echocardiography Statement of Comprehension

Student Signature Page / Agreements

The Echocardiography Program Handbook is a dynamic document that will be revised as needed. The program faculty reserves the right to modify, amend, or delete statements in the Student Handbook and to make changes in the curriculum, calendar and the policies as deemed necessary. Failure to read or comply will not excuse the student from accountability. Students will be notified in writing when any changes are made.

Directions: Please read, check the box, and sign your name and date at the bottom:

- I agree to maintain confidentiality regarding all aspects of clinical situations.
- I hereby authorize DACC to release requested clinical requirements to agencies as required.
- I understand and agree to comply with the policies and regulations as stated in the DACC Echocardiography Handbook, course syllabus, college catalog, and clinical facilities.
- I understand I should have health insurance, and I understand that it is my responsibility to obtain my own medical care at my own expense for any injuries or illnesses sustained as a direct or indirect result of my affiliation with the facility.
- I understand working more than 20 hours a week may hinder my success in the Echocardiography program.

My signature (below) acknowledges my receipt of the Echocardiography Program Handbook and the understanding that I am held accountable for knowing and abiding by the policies of the Advanced Certificate Echocardiography Program at DACC, as a student in the program.

Student Name (print): _____

Student Signature: _____ Date: _____

The signed copy of this form is maintained in your Echocardiography student file.

19.6 Form #6—Sonography Statement of Comprehension

STATEMENT OF COMPREHENSION OF SONOGRAPHY PROGRAM HANDBOOK

Student Name: _____

My signature below attests to the fact that I have read and have had explained to me the policies and guidelines contained within the Sonography Program Handbook and that I allow DACC to release pertinent demographic, academic and medical history information about me to the appropriate personnel at the clinical sites.

I also acknowledge that I am responsible for reading all the information and adhering to the rules, policies, and guidelines contained in this Handbook.

Student's Signature

Date