Purpose:
To provide instruction on proper use of centrifuges for research laboratory staff and students.

Application:
All centrifuge users within the College of Biological Science should be familiar with the procedures described below.

In the Science Complex, shared centrifuges are located in SCIE 2202A/B, 3202B, and 4203. Teaching centrifuges are located in 4103E.

Safety Precautions:
- All operators must receive training on the safe operation of the centrifuge prior to using the equipment. Training may be delegated to a qualified individual, but it remains the responsibility of the supervisor to ensure their personnel are adequately trained.
- Do not centrifuge flammable or explosive materials.
- Do not exceed the maximum rated speed for any rotor.
- Always use a balance to verify even weight distribution.
- Always use the correct tube or tube/adapter combination for the rotor.
- Stay with the centrifuge until full speed is attained. Abort the run if there is any unusual noise, vibration or smell and report immediately.
- Never attempt to open lid when rotor is spinning.
- In the event of a spill inside the centrifuge, keep lid closed and refer to CBS SOP for biohazard spills.

Notes:
- Use of common centrifuges is limited to members of the College of Biological Science, unless written permission is provided by a Departmental Chair. Permission is limited to the specified number of uses, and the user must take responsibility for any damage to the equipment.
- Review the manufacturer’s instructions prior to using equipment.
- Corrosion severely limits the useful life of rotors, so exercise proper care and keep rotors clean and dry.

Procedure:
- Preparation
  - Determine the appropriate rotor type for your application (swinging or fixed angle), and confirm the tubes you intend to use are compatible. Using the wrong tube may cause damage to the rotor, a spill or the loss of your sample. Rubber adapter sleeves are available for certain tubes.
Where applicable, sign out the rotor from Chemical Stores. Inspect the rotor to ensure there are no scratches, dents, or other defects.
- If the samples will be centrifuged at low temperatures, pre-chill the rotor and ensure the centrifuge chamber temperature is set appropriately.
- Wear the appropriate PPE for the materials you are handling (lab coat, gloves, eye protection).
- Aliquot samples into labeled tubes and cap securely. Inspect the tubes to ensure they are in good condition with no cracks or brittle areas.
- If necessary, aliquot water blanks into clean tubes for balancing. Use a balance and adjust the volume in your water blanks to ensure the load is evenly distributed.
- Place tubes in an appropriate rack or tray for transport.
- If required, use a cart to transport samples and rotor to centrifuge room.

- **Loading Centrifuge**
  - Inspect the centrifuge chamber prior to use to be sure it is free of any debris, dirt or leaks. Wipe the chamber clean with a soft towel if necessary.
  - Prior to each use of the ultra-centrifuge rotors, you must lubricate the O-ring on the rotor lid with high-vacuum grease.
  - Make sure the rotor parts/buckets are dry prior to placing on the spindle. Use caution when putting the rotor in place – rotors can be heavy and you must ensure it engages on the spindle properly.
    - If you are using a swinging bucket rotor, ensure the numbers on the bucket and the arms match.
  - Load samples and blanks into opposing rotors or baskets. Ensure the load is fully balanced – minor variations will be amplified at speed.
  - Secure the rotor/bucket lid in place – hand tightening is sufficient.
  - Close chamber lid securely, and ensure it latches properly.

- **Operating Centrifuge**
  - **DO NOT EXCEED THE MAXIMUM SPEED FOR THE ROTOR.** Due to the large forces involved, misuse can result in a catastrophic failure.
  - Set time, temperature and speed to the desired settings. On the ultra-centrifuge, depress the vacuum button prior to initiating the run.
  - Stay in the area until set speed is reached. If any unusual noise or vibration occurs, deactivate centrifuge immediately and report issue to your supervisor.

- **Retrieving samples**
  - When the run is complete, wait for centrifuge to come to a complete stop before attempting to open lid. The lid is interlocked and will not function while rotor is spinning.
  - On the ultra-centrifuge, you must press ‘vacuum’ to return the internal pressure to normal prior to opening chamber lid.
  - Retrieve samples and remove the rotor. If there has been a spill of a biohazardous material, close the chamber lid for 30 minutes and allow aerosols to settle prior to cleaning (See CBS SOP of biohazard spill). If there is a spill of non-hazardous material, clean the rotor warm water and a mild soap or detergent.
  - Rinse the rotor, wipe it dry with a soft cloth, then place on a rack to dry completely.
  - If necessary, clean the interior of the chamber as well, so the equipment is ready for the next user.
- **Centrifuge Log**
  
  o Enter the required information into the centrifuge log book.
  o Where applicable, return the rotor to Chemical Stores and complete the rotor log book.

**Contingency Plan:**

- **Equipment Malfunction**
  
  o If there is any indication of malfunction (unusual vibration, noise, smoke, smell) immediately deactivate the centrifuge and post a sign indicating it is out of service.
  
  o Report equipment problems to supervisor so repair can be arranged.

- **Spill within equipment**
  
  o When you become aware of a spill in a centrifuge, ensure the lid is closed and do not disturb the centrifuge for 30 minutes to allow aerosols to settle. Refer to CBS SOP on Biohazard Spills for clean up procedures.

- **Spill during transport**
  
  o If a spill occurs when transporting a potentially hazardous sample, evacuate the immediate area and call EHS at x53282 for assistance, or x2000 in off-hours.

**Applicable Policies & Regulations:**

- University Policy 851.07.01