**Department of Human Resources**

**OPSEU Job Description**

**Job Title:** Chemical & Instrumentation Technician

**Job Number:** SS-049

**NOC:** 4012

**Band:** 8

**Department:** Chemistry

**Supervisor Title:** Chair, Chemistry

**Last Reviewed:** February 25, 2020

**Job Purpose**

Provides technical support to undergraduate teaching of Chemistry courses. Responsible for performing a variety of duties related to the preparation and operation of undergraduate labs in various undergraduate Chemistry courses, as assigned by Chair. Sets up laboratory equipment and experiments for laboratory courses. Operates, maintains and demonstrates the use of all instruments within the department. Instructs laboratory sessions in a formal laboratory setting. Maintains inventory of required chemicals and glassware. Assists with the development of experiments for undergraduate courses. Coordinates and handles all hazardous chemical waste for science departments. Maintains NMR instrument. Assists in the operation of Science Stores.

**Key Activities**

1. Operates, demonstrates the use of, maintains, and repairs analytical instruments within the Chemistry department. Explains the principles of operation of instruments to undergraduate students individually or in groups and also to faculty and researchers. Installs and commissions new instruments. Independently becomes familiar with the operation of the instrument and writes the operating instructions for use in lab manuals. Maintains these instruments by doing routine maintenance procedures and maintaining an inventory of supplies. Repairs these instruments in house when needed, contacts and arranges outside service. Controls the Departmental Instrumentation account, ordering supplies and parts on instruments. Evaluates space priorities and requirements for departmental instruments and equipment. Identifies course requirements and facilitates laboratory scheduling to ensure availability of needed instrumentation.
2. Performs a variety of duties related to the preparation and operation of undergraduate labs in various undergraduate Chemistry courses. Accurately prepares solutions and sets up equipment. Prepares and dispenses to students the chemical solutions needed for the experiments they are performing in their weekly labs. Sets up and calibrates equipment. Demonstrates operation of equipment to teaching assistants and students, as needed. Maintains inventory of required chemicals and glassware specific to assigned courses. Tracks and records student equipment breakage. Obtains and organizes Safety Data Sheets in Chemistry teaching laboratories for assigned courses and corresponding preparation area.
3. Under general direction from a course instructor assists with development of experiments for undergraduate courses including design assistance, modification of existing experiments, and preliminary trials of new experiments. Troubleshoots experiments when necessary.
4. Under general direction of instructors, schedules lab partners and rotation schedules for assigned courses.
5. Coordinates and handles all hazardous chemical waste for assigned science departments. Determines and implements procedures for proper handling and storage of hazardous waste chemicals. Moves and properly stores all waste into the secure storage area. Bulks compatible chemicals together into containers for shipping. Maintains up-to-date inventory of chemicals in the hazardous waste storage facility for use by the hazardous waste disposal company and works with this company during scheduled hazardous waste pickups. Advises faculty in Chemistry and other departments on safe chemical storage and procedures in laboratories. Responsible for collection and categorization of laboratory hazardous waste in assigned courses.
6. Laboratory supervision: Explains the principles of operation of instruments to undergraduate students individually or in groups. Instructs students during weekly laboratory sessions. Teaches and demonstrates proper laboratory techniques, equipment operation and proper safety practices to students.
7. Coordinates and maintains upgrades in instrumental computational requirements. Arranges installation and necessary connections for instrumental computers. Organizes space requirements, and required interfaces for teaching computers.
8. Assists in the operation of Science Stores. Acts as backup Science Stores Manager, as required. Dispenses chemicals and equipment to faculty, students and researchers. Ensures proper paperwork is completed for account billing and regulatory purposes. Receives and signs for goods delivered.
9. Maintenance of the NMR instrument. Dispenses liquid nitrogen from bulk storage tanks to transfer tank and adds the liquid nitrogen to the NMR Magnet Dewar as needed (weekly). Also transfers Liquid Helium from delivered transfer Dewar to the cryogenic chamber of the NMR magnet as needed (~ 4 times per year). Demonstrates use and provides training to graduate and undergraduate students in the proper operation of NMR experiments. Coordinates with outside contractors on training, repair, and maintenance related to the NMR instrument.
10. Program and related record keeping for the programmable door access keypads for instrument rooms and facilities.
11. Billing account holders for instrumentation use and departmental ice usage by pricing withdrawal forms and forwarding same to Financial Services in order that the departmental account is reimbursed.
12. Acts as backup Chemical Technician, as required.
13. Other duties as assigned.

**Education**

Honours Bachelor of Science in Chemistry or a related discipline.

**Experience Required**

* Minimum two years of experience as a chemistry technician including one year of significant experience in operation and maintenance of an instrumentation facility for chromatography and spectrophotometry or spectroscopy.
* Good general scientific knowledge related to experiments and their preparation.
* Ability to instruct students in laboratory techniques.
* Good administrative and organizational skills.

**Responsibility for the Work of Others**

Indirect Responsibility

* Teaching Assistants
* Chemical Technician's Assistant (student hired by Chair)

**Communication**

Internal:

* Students, to demonstrate the operation of an instrument
* Students, to demonstrate a laboratory technique
* Other Staff, to decide how to distribute equipment between simultaneous laboratory sections
* Faculty, to persuade him/her to change a laboratory exercise to make more effective use of equipment or supplies
* Faculty/Staff, to discuss changes to laboratory exercises, either technical or logistical
* Faculty/Staff/Students, to respond to inquiries about how to handle and store a specific type of hazardous waste chemical
* Physical Resources/Science Workshop/Science Facilities Manager - arranging to have some repairs or upgrades done in the Department
* Faculty/Student, exchanging necessary information during dispensing of chemicals or equipment and completing the paper work in Science Stores
* Teaching Assistants, to demonstrate a laboratory technique, respond to inquiries regarding laboratory demonstration, discuss changes to laboratory exercises
* Computer Technicians, to discuss departmental and instrumental computer needs

External:

* Suppliers, to discuss availability and price of needed supplies
* Hazardous Waste Disposal Company Representative, to discuss the details of the inventory for the upcoming waste pickup
* Delivery personnel, to receive goods at Science Stores and complete any necessary paperwork
* Liquid Helium supplier to discuss/arrange delivery of time sensitive liquid helium
* Instrument experts, to discuss operation, maintenance, repair, or software issues regarding instrumentation
* Trent Community: act as a resource

**Motor/ Sensory Skills**

* Fine Motor Skills, Dexterity - Repairs and adjustments to analytical instruments requires accuracy and precise movement, weighing of chemicals and preparation of solutions to exact concentration requires accuracy and precise movement.
* Gross Motor Skills, Coordination - Pouring chemicals from 4 to 20 litre containers into 200 litre drums requires control and skilled manual action
* Dexterity - Manipulation of small vials and syringes to inject samples into chromatographs requires skillful movement of fingers and hands, keyboarding for writing procedures and operation of computer interfaced instruments requires speed and accuracy, required to program door access keypads
* Coordination - Lifting equipment and instruments on and off of carts moving to different locations in the building requires skilled manual action
* Hearing - Detecting a change in tone or pitch of an operating instrument can often alert one to a problem and acting on that information can reduce the damage to the instrument and therefore reduce the cost of the repair.
* Smell - Identifying the nature and source of a smell in the case of a spill or an experiment gone wrong and acting on that information can reduce the danger from such a situation.
* Touch - precision in manipulating equipment and measuring devices
* Visual - Fine adjustments of small screws or dials during repair and calibration of instruments requires focus on small items, reading of small displays and numerous types of equipment and instruments including very fine scales to obtain accurate results requires accurate focus on small number markings, precise focus on fine etched markings on analytical volumetric glassware is required to prepare accurate chemical solutions.

**Effort**

Mental:

* Sustained Attention - Required when adjusting or calibrating instruments, required when preparing accurate analytical solutions
* Sustained Concentration - Required when reading and absorbing information from instrument manuals, required when editing Departmental webpage
* Listening - Required when receiving verbal instructions on laboratory revisions, etc. by faculty, required when addressing student questions relating to laboratory exercises

Physical:

* Lifting - Required when pouring of chemicals from 4-20 litre containers into 200 litre drums, required when dispensing chemicals from 20 litre containers
* Lifting/Moving/Carrying - Required when moving and storing hazardous waste on shelves in the secure storage area
* Lifting/Carrying - Required when setting up equipment for undergraduate laboratories, required when dispensing and receiving chemicals and equipment in Science Stores
* Standing - Required when preparing solutions for undergraduate laboratories and administering labs
* Bending - Required when repairing some instruments
* Walking/Climbing - Required when duties involve work in more than one location within the department; Moving heavy dewars to the NMR room, climbing ladder while maneuvering cryogenic transfer lines to fill NMR magnet

**Working Conditions**

Physical

* Dangerous equipment
* Dangerous materials
* Repetitive strain
* Noise
* Odors
* Risk of exposure

Psychological:

* Conflicting priorities - Conflicting work priorities when faculty require laboratory setup changes with little notice
* Interruptions - Interruptions and the expectation to respond immediately when in the midst of an equally important task.
* Complaints – Fielding laboratory and instrumentation requirement complaints from faculty, staff, and students.
* Multiple competing demands – Providing simultaneous support in several courses / faculty / university events.
* Lack of Control over pace