**Department of Human Resources**

**OPSEU Job Description**

**Job Title:** Demonstrator/Technician

**Job Number:** SS-030

**NOC:** 4012

**Band:** 8

**Department:** Physics and Astronomy

**Supervisor Title:** Chair, Physics and Astronomy

**Last Reviewed:** August 11, 2020

**Job Purpose**

In co-operation with faculty and other instructors and under the general direction of the Chair, develops undergraduate experiential learning opportunities; instructs, supervises, demonstrates for, and marks undergraduate students at all levels in experiential learning components of courses; coordinates and supervises teaching support staff; provides technical support for teaching facilities; and provides additional assistance in the delivery of academic services.

**Key Activities**

1. In co-operation with faculty and under the general direction of the Chair, organizes, prepares equipment for, and teaches and supervises students in experiential learning activities at all levels in the undergraduate Physics curriculum.
2. Prepares equipment and assists instructors in lecture demonstrations, when necessary.
3. Independently becomes familiar with equipment used in experiential learning activities and writes instructions for use in lab manuals.
4. Designs and prepares lab manuals, handouts, and assignments. Organizes objectives and instruction of experiential learning components of courses. Provides background information for teaching support staff.
5. Coordinates management of the section of the LMS associated with experiential learning activities in undergraduate, including entering grades; posting announcements, course content, assignments, and quizzes; and monitoring discussion forums.
6. Addresses student questions on course-related material as well as curriculum and scheduling choices, providing individual advice and assistance both online and in person. Assists instructor in arranging accommodation for missed experiential learning activities.
7. Evaluates students on the basis of written work, lab reports, assignments, tests, exams and oral presentations.
8. Invigilates tests and exams.
9. Coordinates teaching support staff assisting with experiential learning activities. This includes, in co-operation with course instructors, preparing and describing work tasks (both in-class and marking), monitoring work progress, and troubleshooting problems as they arise.
10. In co-operation with faculty and under the general supervision of the Chair, contributes to the development of new demonstration and experiential learning activities as well as updating existing ones, including researching, planning, testing equipment, and revising based on experience and feedback.
11. Continues education to advance or maintain proficiency in technological and job-related knowledge.
12. Maintains teaching equipment relevant to current and anticipated courses, including troubleshooting, researching and implementing repairs, construction, and installation.
13. Works with Chair and faculty on department outreach and recruitment, including contributing to hosting guests at university open houses and school visits.
14. Participates in any internal or external committees as mutually agreed upon with the Chair.
15. Oversees implementation of Health and Safety regulations in experiential learning settings.
16. In consultation with the Chair, develops the academic undergraduate course timetable for Physics & Astronomy in cooperation with the Registrar’s Office and instructors, and with other academic units.
17. Advises the department regarding registration qualifications and enrolment caps for course sections in the department.
18. Assists in training teaching support staff in the use of teaching-related software.
19. Coordinates access controls for department space, including programming door codes.
20. Responsible for maintaining the laboratory teaching budgets, as well as the budgets for special projects.
21. Responsible for maintaining inventory of and booking loans for department teaching equipment, teaching reference material, and supplies; including keeping records of and reporting to the Chair equipment in need of repair or replacement.
22. Investigates and purchases equipment and supplies associated with experiential learning activities when needed.
23. Liaises with instructors, technicians, and demonstrators from other departments regarding shared equipment and joint projects. Liaises with physical resources and science facilities regarding equipment installation, removal, and other issues which arise. Assists senior undergraduate and graduate students in design, construction and installation of equipment as needed in laboratory and computational research for theses.
24. In the context of undergraduate curriculum delivery oversees implementation of health and safety requirements, including CNSC, WHMIS, and hazardous waste.

**Analytical Reasoning**

Highly complex analysis, mathematical and physical reasoning, including use of algebra and calculus, understanding and application of physics concepts and material from physics courses at all undergraduate levels.

Academic leadership in physics laboratories at all levels.

Applications of teaching pedagogy and determination of the best approach for effective communication of difficult concepts to a wide variety of students.

Relevant work example: Works under the guidance of faculty to continuously refine and develop new lab experiments for undergraduate physics classes – requires analysis and evaluation of the strengths and weaknesses of current experiments, as well as judgements regarding feasibility for new experiments given budget and equipment constraints. Also, instruction of complicated physics concepts during experiential learning activities – requires interpretation of student feedback in real time.

**Decision Making**

Leads a set of laboratories and tutorials and determines the optimal laboratory equipment, teaching resources, pace and order of delivery, marking scheme, and assignment of marks to a wide range of students.

Relevant work example: Works to accommodate students who are absent from labs – Based on availability of equipment and facilities, and feedback from course instructor makes decision on how (or whether) the student can be accommodated. Makes complicated decisions involving conflicting requirements from multiple sources when developing physics undergraduate course timetable.

**Impact**

Has an essential role in developing, refining, and delivering experiential learning components (i.e. labs) in physics courses. Coordinates and trains teaching support staff associated with experiential learning components and troubleshoots their problems. Responsible for evaluating students in experiential learning components and responding to their feedback and complaints. Ensures that all WHMIS and CNSC requirements are implemented with regards to experiential learning activities. Ensures students and teaching support staff are instructed on, and follow, safety guidelines during experiential learning activities. Serves as a representative of the university and physics department during open house and outreach activities.

Relevant work example: The consequence of error in decision making or absence can impact the safety of students and staff and/or cause the cancelation of a single lab section for a single course (unavoidable limited absence), all lab sections for a single course (medium term absence), or all lab section for all courses (extended absence). An error in decision making while developing the physics undergraduate course timetable can result in conflicts for students across years and disciplines.

**Education**

Master’s Degree in Physics (preferred) or a closely related discipline.

**Experience Required**

1. Two years related laboratory and teaching experience.
2. Strong presentation skills; experience facilitating labs and managing both large and small groups.
3. Advanced skills in Microsoft Word, Excel, PowerPoint; familiarity with programming languages like Python and MATLAB; ability to identify and resolve problems with Windows and computer hardware during experiential learning activities.
4. Demonstrated ability to work independently with minimal supervision, and as part of a team.
5. Strong organizational, interpersonal, and communication (written and verbal) skills.
6. Excellent analytical, research, and planning skills.
7. Excellent judgment and decision-making skills.
8. Excellent interpersonal skills and a commitment to continuous improvement.

**Responsibility for the Work of Others**

Direct Responsibility

* Teaching support staff (e.g. Graduate and undergraduate teaching assistants and markers)
* Student employees (e.g. students in Summer Work Programs)

Indirect Responsibility

* Other Demonstrator/Technician colleagues and regular fulltime colleagues.

**Communication**

Internal:

* Students: teaching, assignment and report critique, discussion of accommodations, interviews
* Technicians: equipment repair and replacement
* Finance Department: purchasing
* Technicians (external): discuss sharing of equipment, space, resources
* Staff and Faculty: answer queries
* Faculty: department business, develop, refine, and administer labs and lecture demonstrations
* Teaching Assistants: explanation of lab experiment goals, common issues, safety, equipment operation; explain marking schemes and answer questions as necessary
* IT: discussion of hardware and software problems
* Physical Resources – repairs, new projects.

External:

* Suppliers: gather information and quotes and order equipment
* Technical Staff from other Universities: occasionally collaborate on the development of new lab experiments and demonstrations
* Trent Community: act as a resource
* High School teachers: act as a resource, assist with visits to the physics department
* Primary School teachers: act as a resource
* Parents and prospective students: act as a resource in recruitment efforts

**Motor/ Sensory Skills**

* Fine Motor Skills - manipulating equipment and measuring devices, keyboarding and data entry
* Dexterity – precision in manipulating equipment and measuring devices
* Gross Motor Skills – moving lab furniture, heavy equipment
* Hearing – responding to student and faculty queries
* Sight – reading and marking reports involving tables, figures, and equations; precision in manipulating equipment and measuring devices
* Touch – precision in manipulating equipment and measuring devices

**Effort**

Mental:

* Sustained concentration - marking assignments, reading new material, analyzing problems, debugging software and working with equipment, sometimes extended days depending on scheduling of labs

Physical:

* Standing, Walking - administering labs
* Lifting - moving equipment and rearranging labs/classrooms

**Working Conditions**

Physical:

* Injury – operation of dangerous equipment
* Monotony – data entry, organising marked assignments, performing equipment inventory
* Injury – exposure to dangerous materials, radiation
* Discomfort – poor lighting and noise conditions

Psychological:

* Complaints – complaints from students regarding marks, timetables, other concerns
* Conflicting work – many different tasks at once (managing and teaching labs for multiple courses, technical support duties)
* Handling of student appeals –vexed students upset with grades, consulting with teaching support staff and course instructors
* Interruptions – emergency support and last-minute changes that may interrupt planned activities and schedules
* Lack of control over pace of work - academic term “end rush”, unavoidable busy periods
* Multiple competing demands – instructing in experimental learning components of several courses, while also responsible for implementation of safety standards, equipment upkeep, purchasing, lecture demonstrations, and lab development