

Job Description

Job Title:	Instructor and Undergraduate Lab Manager
Department:	Physics & Astronomy
Reports To:	Laboratory Director
Jobs Reporting:	Laboratory staff (3 positions)
Salary Grade:	USG 12
Effective Date:	May 2019

Primary Purpose

The Laboratory Instructor/Manager is directly accountable to the Laboratory Director for the effective delivery of the undergraduate teaching laboratories in the Physics and Astronomy department, including those for specialized (astronomy) and interdisciplinary (Materials and Nanoscience, MNS) programs. The position is dual-role; as an instructor of multiple lab courses and as a manager of the undergraduate laboratory program.

As the Lab Manager, this person provides leadership and oversight to the entire lab program, in order to ensure that all facilities, equipment and resources meet the needs of the program and that all experiments are conducted appropriately and safely. This role oversees short and intermediate term operational planning, including managing the undergraduate laboratory scheduling and lab operating expenditures, sourcing capital equipment, and recommendation and oversight of renovation projects for the lab teaching space. The position also has overall accountability for the design and fabrication of lab apparatuses and the incumbent is required to have broad knowledge of experimental hardware and software.

As the Senior Lab Instructor, this position may be expected to teach approximately ten lab courses per year, as well as oversee the instruction being performed by the other Lab Demonstrators, graduate TAs and department technical staff.

Key Accountabilities

Organization and Administration of Physics Undergraduate Labs

- Organizes and administers the laboratory course components of the Physics, Astronomy and MNS undergraduate programs. This includes oversight, supervision and management of all associated laboratory offerings to ensure their smooth and safe operation.
- In coordination with the Department Administrative Assistant and Associate Chair, schedules and sets enrolment caps for all laboratory courses and sections offered each term.
- Collaborates with faculty and staff members who are teaching related courses in order to ensure that course material and lab skill development are properly coordinated.
- Participates in both the undergraduate laboratory committee and curriculum committee.
- Acts as the X-ray permit holder for instruments used in the undergraduate labs.
- Assists with other duties or special projects which may be assigned by the Lab Director.
- Liaises with the Associate Chair with respect to the use of physical space.

Course instruction

- Responsible for the instruction and operation of assigned lab courses and open lab sessions.
- Provides an advanced level of guidance, instruction and technical assistance to students enrolled in undergraduate physics lab courses.
- Marks student assignments and tests or oversees the marking performed by TAs.
- Conducts tutorials and demonstrations relating to lab content.
- Responsible for the content, development and administration of lab assignments, tests and exams.
- Develops lab manuals, teaching aid materials and web-based learning materials.
- Monitors students' lab progress by evaluating reports and lab exams in the technical and theoretical aspects of the subject matter, and providing timely feedback on their submissions.
- Ensures academic integrity is maintained in the lab courses.
- Oversees student matters (late enrollments, attendance, special situations).
- Assists students on an individual or group basis with lab and related assignments/problems.
- Develops syllabi and LEARN sites for assigned courses.
- Sets and manages due dates, handles communication with TAs for student submissions.
- Maintains an awareness of current innovations in the area Physics and Physics education, and where feasible, incorporates them into the laboratory curriculum.
- Constructs, sets up, tests and removes equipment used in lab experiments

Supervision

- Supervises laboratory staff by managing daily operations and conducting annual performance reviews.
- Provides mentorship and clear direction to laboratory staff on teaching, professional development and administrative issues.
- Trains teaching assistants in lab equipment procedures and/or theory, and provides guidance on the effective instruction of the laboratory experiments.
- Ensures that TA teaching quality is consistent with departmental standards, giving extra training and coaching where necessary.
- Ensures the effective utilization and development of TAs who assist on a term-to-term basis.
- Directs lab TAs through the academic term cycle: assigning duties, coordinating their lab activities, marking and proctoring duties.
- Reviews lab TA performance evaluations, nominates outstanding lab personnel for TA awards.
- Provides practical training, oversight, and assistance with graduate students using the X-ray apparatus for research purposes.
- Trains other laboratory staff in the use of specialized hardware or software where required.
- Supervises co-op students hired to work with the undergraduate physics laboratory team.

Lab operations

- Monitors equipment performance to ensure adequate quality and safety control, and arranges required maintenance.

Job Description



- Responsible for the checking and storing of lab equipment and the care, maintenance and upkeep of all undergraduate laboratory equipment and systems.
- Maintains an up-to date inventory of equipment and recommends purchases to keep current with evolving technology.
- Provides technical support for the evaluation and purchase of new laboratory equipment.
- Oversees the procurement of undergraduate lab equipment
- Ensures all laboratory and storage areas are kept orderly and tidy.
- Develops lab specific safety procedures and ensures that the facility functions according to all applicable safety rules and regulations.
- Recommends and implements approved upgrades and improvements to lab facilities and practices (including techniques and procedures).
- Conducts and evaluates prototype labs
- Ensures that all laboratory sessions are properly and adequately supervised and that instructional resources are available when unexpected absences occur
- Applies and enforces academic regulations and ensures that this is consistent across the different lab courses.
- Ensures the existence of up to date lab manuals and teaching aids for labs

Required Qualifications

Education

- Ph.D. degree in Physics or related discipline, or a MSc degree with five or more years' experience teaching undergraduate labs.

Experience

- Broad experience with physics laboratory equipment and systems of equipment
- Lecturing, mentoring and supervisory experience.

Knowledge/Skills/Abilities

- Extensive practical and theoretical knowledge of undergraduate physics curriculum
- Extensive knowledge of a very broad range of hardware and software used in physics experiments.
- Aptitude for teaching and a passion for motivating and engaging undergraduate students
- Excellent oral and written communication skills
- Excellent organizational, time management, interpersonal and analytical skills
- Proficiency in productivity software such as Microsoft Word, Excel and PowerPoint.
- Proficiency in technical software; LabVIEW, Igor pro, Python.
- Demonstrated proficiency or willingness to participate in safety training on the use of x-ray sources, cryogenic fluids, compressed gas, lasers and chemical safety.

Nature and Scope

- **Contacts:** Works closely with the Lab Director to implement a laboratory program that is innovative, forward-looking and pedagogically sound. Works with the Associate Chair of Physics and Astronomy for management of

Job Description



space and integration with curriculum, as well as providing performance review of lab staff. Works with the Administrative Assistant to schedule labs each term. Works with the Administrative Officer and the Financial officer with respect to budget preparation and equipment purchases.

- **Level of Responsibility:** Has the authority and responsibilities to schedule the undergrad lab times, and oversee purchase of lab equipment. Incumbent is responsible for ensuring the smooth operation of all undergraduate labs, including assigning lab course instructors and graduate TAs. The position is also responsible for administration, practical training, assistance and oversight of any x-ray workers identified under the permit who wish to use the undergrad facility. Creates a positive work environment, motivates staff and ensures successful and productive outcomes.
- **Decision-Making Authority:** This position has authority to assign teaching tasks to lab teaching and technical staff, and to schedule labs each term, including setting enrolment caps. The position has authority to execute an approved equipment budget, which may exceed \$100,000 in a given year.
- **Physical and Sensory Demands:** There are potentially heavy workloads associated with the operation of the full set of undergraduate laboratories within the teaching environment due to the multifaceted nature of the program. This is a broad-based position, and in-depth technical expertise is required to resolve ill-defined and highly unstructured problems that regularly surface.
- **Working Environment:** The position includes office work and work in laboratories, including setup, testing and instruction. Some labs will require proficiency in safety procedures for working with x-rays, cryogenic fluids, compressed gas, lasers and hazardous chemicals. The role may require working more than seven hours on a given day and more than 35 hours a week during peak times. This can be compensated via a reduction of hours during quieter periods.