

Job Description

Job Title:	Lab Instructor - Bioengineering
Department:	Systems Design Engineering
Reports To:	Lab Director, Systems Design Engineering
Jobs Reporting:	Teaching Assistants, Co-op Student (on occasion)
Salary Grade:	USG 12
Effective Date:	July 2023

Primary Purpose

The “Lab Instructor – Bioengineering” is a key educator and resource for the undergraduate students in the Biomedical and Systems Design Engineering programs within the Department of Systems Design Engineering. The Lab Instructor – Bioengineering provides instruction, guidance, and technical assistance for courses with labs and for design-project and workshop courses, and is responsible for ensuring safe lab practices are taught and maintained at all times. In particular, the incumbent will be the primary wet-lab instructor in the programs and must be experienced in Biosafety Hazard Level 1 labs at a minimum.

The Lab Instructor – Bioengineering should have comprehensive theoretical and practical knowledge of biomedical systems and equipment, chemistry, biochemistry, biomaterials and cell biology, along with other common technical areas underpinning engineering wet-labs. Additionally, knowledge of mechanobiology, human physiology and anatomy, tissue-engineering, biomedical design principles, biomedical imaging, environmental chemistry, sensors, actuators, mechanical components, and fabrication techniques will be considered an asset. The Lab Instructor – Bioengineering is responsible for the operation of several laboratory spaces and acts as the primary manager and mentor to the associated Teaching Assistants.

Key Accountabilities

Provide instructional support and mentoring to students in Engineering laboratory courses:

- Present theory and concepts to students pertaining to laboratory experiments
- Demonstrate safe laboratory practices and ensure safety protocols are maintained
- Demonstrate all laboratory experiments in assigned Biomedical and Systems Design Engineering courses with labs
- Present and develop information for students concerning laboratory safety
- Prepare and modify laboratory manuals and procedures as needed
- Apply pedagogical expertise to continuously improve lab course structure and content; this may include independent and significant modification or redesign of lab material in addition to development of innovative material for new or existing courses
- Collaborate with academic counterparts of lab courses to synchronize the presentation of material
- Enrich the student experience of the lab component through the development of multi-media instructional aids such as videos, demonstrations, web content, etc.
- Resolve student/lab issues such as attendance and special situations

Management of the teaching assistants:

- Manage laboratory teaching assistants with regard to lab schedules and procedures
- Train teaching assistants in the safe and proper usage of lab equipment and software
- Participate in the selection of teaching assistants and in their performance evaluations

Job Description



<ul style="list-style-type: none">• Assume an active leadership role in the mentorship and development of teaching assistants
Management of Bioengineering undergraduate labs: <ul style="list-style-type: none">• Prepare and maintain lab experiments and equipment for scheduled lab times• Lead in and provide assistance in the design, development and fabrication of complex laboratory experiments• Participate in keeping the labs and experiments current with new technology• Responsible for setup and maintenance of equipment per manufacturers' design specifications• Maintain lab spaces in accordance with University health and safety standards• Maintain current First Aid certification and act as first point of contact for incidents
Provide mentoring and technical support to students in design project and workshop courses: <ul style="list-style-type: none">• Participate as a technical consultant for students taking design courses distributed throughout the entire undergraduate program• Participate as a supervisor/advisor for student design projects as time permits• Resolve unstructured technical problems• Ensure that safe practices are followed in the engineering workshops and labs• Demonstrate the proper use of lab and workshop equipment and tools• Manage and track departmental funds used to supplement student design project costs
Other duties include, but are not limited to: <ul style="list-style-type: none">• Participates in special projects (e.g. curriculum development, faculty-wide initiatives, special reports, etc.) as assigned by the Lab Director or Program Director• The incumbent will be required to serve on committees pertaining to lab and workshop outcomes, safety, departmental staffing, student experience reviews, and others as the need arises• Occasionally technical staff are required to move equipment and furniture as well as set up displays and help with outreach events

**All employees of the University are expected to follow University and departmental health and safety policy, procedures and work practices at all times. Employees are also responsible for the completion of all health and safety training, as assigned. Employees with staff supervision and/or management responsibilities will ensure that assigned staff abide by the above, and actively identify, assess and correct health and safety hazards, as required.*

Required Qualifications

Education <ul style="list-style-type: none">• Bachelor's and Master's degree in Biomedical Engineering or equivalent• Eligibility for licensure as a Professional Engineer is an asset• Valid First-Aid certification is an asset.
Experience <ul style="list-style-type: none">• 2 years of experience in running labs, giving tutorials/lectures and demonstrations, writing and updating lab manuals, developing new labs, marking reports and evaluating technical presentations• Experience in Biosafety Hazard Level 1 laboratories• Experience monitoring and enforcement of safety standards in labs or in an academic environment is required• Demonstrated experience in safe handling of biological materials and chemical substances and performing chemistry and biology lab experiments• Demonstrated experience developing and delivering chemistry and biology lab activities• Experience in the following cell and molecular biology-related techniques are an asset:<ul style="list-style-type: none">○ sterile mammalian and bacterial cell culture○ immunostaining

Job Description



- various microscopy techniques
- enzymatic assays
- Experience synthesizing and characterizing biomaterials
- eExperience collecting and analyzing a broad array of bio-signals and data
- eExperience working with electro-mechanical components and systems
- Practical experience with and sound knowledge of sensors, actuators, hardware design and fabrication, software design, embedded systems, mechanical systems, and mechanical system fabrication
- Experience with biomechanical measures and analyses
- Experience with biomedical signals such as ECG, EEG, and measures such as X-rays and MRI
- Experience with biomedical devices such as assistive devices, implants, prostheses/orthoses, biomedical devices and design
- Demonstrated experience and competency using scientific and lab software applications such as Matlab, various simulators, and CAD.

Knowledge/Skills/Abilities

Must have fundamental knowledge of the core Biomedical Engineering lab material including:

- Proven aptitude for teaching and a demonstrated interest in working with students in a professional manner to provide technical advice and instructional material
- Extensive knowledge and understanding of biological materials and bio-material testing, electro-mechanical systems and modelling and chemical reactions and procedures for experiments
- Solid knowledge of human anatomy and physiology and biomechanical measurements
- Solid knowledge of biomaterial and biological characterization
- Proficiency with Microsoft Office suite of programs required
- Demonstrated ability to work independently and as part of a team within a busy and dynamic environment
- Excellent and demonstrable oral and written communication skills, including strong technical documentation and presentation/facilitation skills
- Strong leadership and supervisory skills with the proven ability to mentor and develop staff.
- Excellent interpersonal, analytical, research, organizational, and creative problem-solving skills
- Must have a strong sense of pedagogy and how it is applied to diverse and changing student group

Nature and Scope

- **Contacts:** Internally, frequent communication is required with staff, students, and faculty members in the department. In addition, the incumbent will regularly present information to students with regard to labs and workshop courses. Externally, this position will occasionally require contact with vendors/suppliers/manufacturers for the purposes of purchasing and maintaining equipment.
- **Level of Responsibility:** The job has specialized work with some supervision and provides guidance to others.
- **Decision-Making Authority:** N/A
- **Physical and Sensory Demands:** Requires exertion of physical and sensory effort resulting in moderate fatigue, strain or risk of injury. Lab supervision requires long periods of standing. Some lifting and transporting of heavy and/or awkward equipment will be required.
- **Working Environment:** Involves moderate physical or psychological risk resulting from unavoidable exposure to hazardous, and disagreeable or uncomfortable environmental conditions. In certain cases, the "Lab Instructor", the teaching assistants, and the students may work with biomaterials, hazardous voltage levels and electromechanical apparatuses. Consequently, safety procedures must be strictly enforced. Incumbent will work within an open concept laboratory and work is subject to several interruptions. Occasional after hours and weekend work will be required.