

Job Description

Job Title:	Fabrication Specialist / Instructor
Department:	School of Architecture
Reports To:	Fabrication Manager
Jobs Reporting:	None
Salary Grade:	USG 7 (37.5hr/wk)
Effective Date:	January 2019

Primary Purpose

The Fabrication Instructor (FI) is responsible for the front-line operations for the extensive and varied fabrication resources located at the School of Architecture. Collectively referred to as the Design and Fabrication Labs (DFL), the resources consist of the A.Lab (analogue fabrication lab), D.Lab (digital fabrication lab), M.Lab (student maker lab) and Design Build Studio, which together support a curriculum deeply founded in the culture of making as part of the design process. In partnership with the Fabrication Manager (FM) and student assistants, the FI will act as a vital member of a highly collaborative team.

The DLF facilitates making and equips students and lab users with the tools, skills and knowledge to function effectively and independently in a fabrication-based design environment. Through their presence the FI will teach, mentor, and supervise students in the safe and effective use of the prototyping, fabrication, research practices and equipment including but not limited to: hand and power tools, machine tools, laser cutting, additive manufacturing, CNC and robotic equipment. Core responsibilities include ensuring the safety, supervision and training of the students in this environment.

Key Accountabilities

List the major responsibilities of the job, divided into 3 to 5 broad categories. These should reflect 80 - 90% of "what" the job does not the "how". Insert a category heading and in bullet form below, state specific responsibilities.

Instruction/Teaching

- Supporting students and instructors in the research and investigation of innovative fabrication materials, processes, techniques. Aimed at the support of the academic curriculum and building on the FI's own expertise or fabrication interest, the FI is expected to actively participate in instruction whether through workshops, tutorials, training sessions, specific lectures or courses.
- Providing expert knowledge in equipment use, methods of fabrication, and material use to a wide range of lab users, ranging from inexperienced and technically unskilled to highly sophisticated and specialized, whether as individuals or as small groups.
- Being responsible for the supervision and instruction of undergraduate and graduate students in the operation of both the analogue and digital equipment as well as educating users in proper safety and housekeeping practices.
- Arranging and administering all required safety orientations, training, facility tours and equipment demonstrations to groups and individuals.
- Providing training and tutorials to lab users in: CNC programming (RhinoCam), CNC router set-up and operation, Laser cutter programming, set-up and operation, (Rhinoceros 3D, AutoCad, Adobe Illustrator), 3D printer file processing, programming, set-up and operation, robotic programming set-up and operation.

- Facilitating access to and monitoring of the labs open hours.
- Ensuring the proper and safe operation of equipment, providing additional skills instruction, and advise on component design and construction.
- Providing instruction and mentoring to lab users helping them to enrich their practical experience with making as part of the design process.
- Giving opportunities for practice and demonstrating techniques that enhance and develop students' machining and fabrication skills.
- Establishing a mentoring relationship with students who exhibit an interest and passion in making, creating opportunities for those students to contribute back to the school community.

Facilities

- Responsibility and accountability, in collaboration with the FM, for the daily operation of the tools and equipment within the DFL (A.Lab, D.Lab, M.Lab & Design+Build Studio and spray booth)
- Maintenance of all DFL facilities, machinery, equipment and studio infrastructure.
- Participation in the review and assessment of current tool and equipment offering and inventories.
- Assistance in the acquisition, upgrade or surplus of equipment as necessary to best address the needs and demands of curriculum, space, technology and productivity .
- Preparation and submission of proposals and/or work requests for purchase and/or maintenance of facilities and equipment deemed essential.
- Participation in the maintenance and operation of all the fabrication resources to ensure a safe organized and efficient work environment
- Contribution to the tracking and maintenance of all tool and equipment inventories including power tools, hand tools, and supplies.
- Maintenance of the labs in a clean and orderly manner, including the ongoing maintenance and inventory control of equipment and tools.

Communications

- Liaising with school administration and Faculty to help determine and prioritize lab schedules based on use and demand.
- Working with local vendors and suppliers for DFL tool and equipment requirements as well as supplies and materials for lab consumables and student projects.
- In conjunction with the Lecturer & Fabrication Manager and the administration office, coordinating studio schedules and project deadlines as presented in course outlines each term.

Health, Safety & the Environment

- The DFL is a Safety-First facility: it is one of the FI's primary roles to maintain a standard of safety and training for all lab users. The FI performs all Safety Training orientations in which safety and proper use of lab equipment is explained and demonstrated.
- Key responsibilities with regards to maintaining safe operations and working conditions of the DFL, as well as in field work sites.
- Providing leadership in understanding and applying pre-use inspections and standard operating procedures for equipment use as per the requirements of the DFL, Joint Health and Safety Committee and the Ministry of Labour.

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- Completion of monthly safety inspections of tools and equipment then filing and reporting pertinent information.
- Ensuring that all safety specific features, guards and apparatus for lab equipment is maintained and functioning.
- Coordinating with the Fabrication Manager / Health & Safety Coordinator to develop Job Hazard Analyses and Standard Operating Procedures for various tasks and equipment.
- Suggesting and implementing protocol to ensure that students, Staff and Faculty are wearing the appropriate Personal Protective Equipment when exposed to hazards.
- Cooperating with the Fabrication Manager in proactively identifying and correcting hazardous conditions in the labs and field.
- Maintaining the operation of the facilities in accordance with all relevant health and safety regulations and the established rules and guidelines of the DFL.
- Enrolling and participating in yearly Emergency First-Aid and Standard First-Aid training, as well as any other Safety Office courses deemed necessary for this position.

Special Projects

- Exhibitions and installations are a regular part of the culture at the School of Architecture. The DFL is often called upon to help facilitate the design and construction of these projects. These projects may relate to academic work, marketing and recruitment, and public community projects. The FI will assist with the design and fabrication of these projects where appropriate.

**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

- 3-year Diploma in related field (Architectural Technology, Civil Engineering Technology, Mechanical Engineering Technology or Industrial Design)
- Or a degree in Architecture or related field (Industrial Design, Fine Arts-Studio)
- Or equivalent combination of education and experience

Experience

- 3-5 years of demonstrated experience in a broad spectrum of practical fabrication media domains machinery and a suite of skills applicable to the modelmaking / prototyping/ woodworking / metal working / machining / fabricating trades. Extensive woodworking experience would be considered a strong asset
- Experience teaching and working with students in both formal and informal settings, for example, providing training in the safe and proper use of digital fabrication equipment and analogue machine tools including, but not limited to: 3D printers, laser cutters, hand tools, power tools, manual machining tools, CNC milling machines, welding, woodworking, basic plastic and metal casting, basic programming, and basic electronics.
- Experience teaching and mentoring students and/or apprentices in a shop/fabrication lab/maker space setting.

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- Experience and expertise in broad spectrum of additive manufacturing and 3D printing technologies (FDM, SLA, PED). Specific experience with ceramic and paste extrusion would be considered a strong asset
- Experience in carpentry and/or jobsite building construction
- Experience maintaining and repairing tools and machinery
- Demonstrated experience in programming and operating CNC routers in combination with expertise using Rhinoceros 3D and RhinoCAM.
- Proficiency using and working with 3D printers and their associated software (Dimension FDM, 3D PotterBot Ceramic and paste printer, FormLab2, 3D PotterBot, MakerGear2 etc.)
- Proficiency in Rhinoceros 3D, RhinoCAM and AutoCad Software
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Experience / or interest in developing an expertise in:

- Experience machining and working with plastics and composite materials
- Proficiency using and working with Laser engravers and associated software
- Experience with metal and metalworking (machining, sheet metal, welding)
- Experience with casting and molding (plaster, concrete and resins)
- Experience programming and working with robotics and robotic fabrication
- Experience working with Electronics, microcontrollers and Arduinos

Knowledge/Skills/Abilities

- Experience teaching, mentoring, and developing a diverse student population in a shop or maker environment
- A keen interest in innovative technologies and processes of making
- Extensive knowledge of safe shop practices instruction and enforcement
- Ability to maintain focus and objectives in a high demand, fast paced environment often with competing projects
- Comfortable providing constructive feedback to lab and equipment users
- Excellent oral communication skills with the ability to train and demonstrate machining, construction and fabrication knowledge and skills to both groups and individuals
- Solid interpersonal skills and team coordination
- Excellent problem-solving skills
- Knowledge of craftsmanship as applied to Architecture and/or Design
- Familiar with new and emerging materials and technologies as well as their use and application
- Ability to safely prioritize work and multitask when there are several competing jobs
- Demonstrated commitment to high professional and ethical standards
- Ability to maintain, troubleshoot and operate a comprehensive offering of digital fabrication tools: 3D printers, laser cutters, CNC Routers and robotic equipment
- Ability to maintain and troubleshoot a comprehensive offering of analogue fabrication equipment: wood and metal working tools and equipment
- Excellent written communication skills
- Understanding and appreciation for the Kaizen philosophy (Continuous Improvement) and associated initiatives
- Basic MS Office skills

Nature and Scope

- **Contacts:** The Waterloo Architecture Design and Fabrication Labs (DFL) provide design and fabrication/manufacturing resources to students, faculty and staff of the School. In addition, other departments in the Faculty of Engineering have been extended the privilege of DFL access. Other faculties and departments of UW can arrange access on special request. The DFL will also on occasion perform contract work for external clients. The FI will maintain a liaison with faculty, be informed of projects, deadlines, specifications, and any demands to be placed on the DFL and its resources by academic use.
- **Level of Responsibility:** In conjunction with the Fabrication Manager, the FI is responsible for making decisions that relate to the health and safety of persons using the architecture DFL resources. The FI independently advises and instructs students and providing feedback. Qualifies students for permission and access to facilities and equipment. Performs equipment maintenance and upkeep as well as supply inventory. Performs POS transactions for fees and services in the DFL
- **Decision-Making Authority:** Responsible for the day-to-day prioritization of user supervision, user support, lab maintenance and upkeep, and on-going lab improvements
- **Physical and Sensory Demands:** The FI can be expected occasionally to handle heavy materials and physical demands are typical of a manufacturing environment; standing for long periods of time, exposure to machine noise and potential for injury. Some tasks may be physically challenging requiring reasonable strength and endurance; use of hand and power tools; working at heights and lifting of heavy materials and equipment. This position experiences an unprecedented amount of interruption at any given time. Demands of dealing with large numbers of students performing high risk operations can be stressful and contribute to strain and fatigue. The nature of an academic shop means the position will experience deadline pressures and competing priorities in conjunction with a demand for thoroughness, accuracy and safety. The FI must be prepared to perform first aid and handle safety emergencies as they arise.
- **Working Environment:** The job may involve working in both indoor and outdoor environments. Indoor working conditions may be similar to a typical wood or fabrication shop with the majority of time spent supervising and assisting students. The DFL is characterized by a hybrid use of both digital and analogue resources and the incumbent must be able to switch spontaneously and effectively from one mode of service to the other at any given point in the day. Outdoor work involves exposure to outdoor elements year-round and the workplace environment may be off-site at remote locations where standards and practices may be undefined. The job will require flexibility in the working schedule in order to best serve the Architecture student population. Regular working hours are Monday – Friday 11:30pm – 8:00pm. Some extended evening and weekend work will be required to accommodate academic deadline periods and installation dates for exhibitions and shows. The role of the DFL is continuously evolving and changing to keep pace with rapidly changing technology and institutional demands. To remain relevant, the nature and scope of this position must evolve in step. The FI is expected be flexible and responsive to the realities of the school's objectives and requirements.