Job Description

Job Title:	Design Engineer
Department:	Mechanical and Mechatronics Engineering
Reports To:	Department Chair – Mechanical and Mechatronics Engineer
Jobs Reporting:	Laboratory Clinic/Engineer, Mechatronics Engineer, Research Engineer, Mechanical and Mechatronics Engineer, Metallography Supervisor/Instructor
Salary Grade:	USG 12
Effective Date:	April 2022

Primary Purpose

The Design Engineer is accountable to the Chair of Mechanical and Mechatronics Engineering to provide senior managerial support and leadership, as well as experienced lead and co-lead instructional roles for Mechanical Engineering design-related courses. Additional responsibilities include student project supervision, and mechanical design services.

The incumbent assumes a core instructor role for ME481/482, the capstone project course. The academic, applied-technical, industrial, business, and entrepreneurial experience of the Design Engineer is leveraged to provide both technical and vital non-technical aspects of a design project.

The Design Engineer provides leadership in long and short-term operational planning for the undergraduate teaching laboratories: WATiMAKE, the Design Studio and occasionally the shared use Materials Lab. This supports activities and projects associated with core undergraduate courses in Mechanical and Mechatronics Engineering. Overseeing operating expenditures and capital expenditures are encompassed, with possible involvement managing renovation projects.

As a senior subject matter expert, the Design Engineer provides advanced guidance, instruction and technical assistance to undergraduate students enrolled in departmental design and design project courses involving complex and abstract concepts.

The Design Engineer can also get directly involved (or have overall accountability) with the design and fabrication of lab apparatus.

Collaborates with the selection, purchase, and installation of design related software in the Mechanical Mechatronics and First Year Engineering classrooms and computer laboratories.

Key Accountabilities

Operational

- Manages the overall operation and technical scaffolding of MME Engineering clinic which include the WATiMAKE Clinic, and the MME Design Studio, and the E7 “Garages”. This entails managing the full-time staffing of the (4) professional engineering teaching support positions within MME Engineering Clinic and Design Studio.
- Supervisory responsibility for the engineering staff equipment purchases in the above spaces.
- The Design engineer must be able to provide guidance and oversight of: the computer software tools required for engineering design within the department and faculty, advise and oversee design

related-software purchases, ensuring that the software is relevant to today's academic and industry demands. They must also ensure that the software is working properly and upgraded to relevant levels and that replacement purchases are judicious and timely, functional, and up to date. This requires liaison with MME IT, Eng Computing, vendors and administrators regarding software implementation and license renewals for design related software (AutoCAD, Solidworks, MasterCam).

- A potential additional responsibility entails supervision of the Engineering Graphics and Design course instruction. This includes the potential participation in the selection of (10) teaching assistants for the ME and MTE 100 concept courses.
- Oversees policies, standards and procedures for the engineering and technical work performed in the WATiMAKE clinic, shared use materials lab, and Design Studio.
- Warrants that the WATiMAKE, shared use materials lab, and Design Studio labs meet or exceed technical, professional and safety standards in compliance with licensing authority, legislative requirements, and University policy/procedure.
- Attends and participates in professional group meetings, conferences, professional association events, etc. and is current on new trends and innovations.

Supervision

- Manages and participates in the development and implementation of goals, objectives, policies, and priorities for the Mechanical and Mechatronics Engineering educational technical unit; recommends within departmental policy, appropriate service and staffing levels; recommends and administers related policies and procedures.
- Leads in selection, training, mentoring, motivation, and evaluation of assigned staff; provides or coordinates staff training, partners with employees to reach or exceed performance expectations.
- Oversees the work plan for the MME professional engineering teaching support (MME Clinic). Meets with these staff to review activities, identify goals, and assists in resolving concerns. Assigns or coordinates work activities, projects, and programs; monitors workflow; reviews and evaluates output, methods, and procedures.
- Provides high and low level technical and professional expertise in the area of staff guidance with respect to ill-defined, non-routine multi-disciplinary challenges which are typically encountered in the day-to-day operation of the clinic.
- Reviews, approves, and implements engineering/technical standards, policies and procedures in accordance with professional and Faculty of Engineering quality standards.
- Provides some interpretation of external codes, regulations, specifications, as well as internal policies and procedures.
- Resolves conflicts related to the MME clinic in terms of equipment usage, scheduling, and staffing during lab times.

Instructional

- Instructor role for the capstone project course (ME481/482). This includes counselling students and their faculty advisors, liaison with industrial representatives, sponsors and external judges, as well as updating the course syllabus, hosting the symposium and awards banquet, and compiling the final grades. As this is a core design course in an accredited program, the course is conducted under the professional responsibility of an individual licensed to practice engineering in Canada (as designated by the PEng designation). The course instructors assume this responsibility and authority. Course Instructors are responsible for:
- Providing feedback on all aspects of the design projects
- Chair all design reviews

- Evaluation of course activities, deliverables, and project scope
- Calling for and conducting additional Design Project Reviews as appropriate
- All grades, in consultation with the Faculty Advisor(s), and considering student peer reviews
- Selecting and approving instructional team members
- In general, teaching components take place in both formal and informal settings. Informal instruction includes addressing student questions that are of a high level of complexity during lab sessions, design reviews, scheduled office hours, and through impromptu student interactions.

Administration

- Service on committees (e.g. safety, symposium, curriculum), regular administrative duties stemming from management of staff (vacation, leave, promotion, hiring)

Technical & Consultative

- Committee membership and participation to provide high-level expertise relating to design courses, laboratory courses, and their academic course counterparts.
- Collaborates with academic counterparts for lab courses to effectively synchronize the learning experience.
- Ensures through the appropriate application of pedagogical expertise to continuously improve lab course structure and content; this may include significant modification or redesign of lab material or personal and team development of innovative material for new courses.
- Ensures personally and through oversight that the enhancement of the student experience of the lab component through the development of multi-media instructional aids.
- Ensures personally and through oversight that the developed experimental test cases for labs adhere to professional and scientific methodologies in a consistent and complementary fashion to their academic counterparts.
- Participates as a supervisor and advisor for senior level student design projects. This includes the ongoing course structure and syllabus implementation, and the ME capstone design symposium planning and execution.
- Assumes lean and supplementary roles as project evaluator for upper year design courses
- Provides expert broad-based and multi-disciplinary professional guidance to undergraduate students taking Mechanical and Mechatronics Engineering and project courses which are distributed throughout the undergraduate program.
- Consultant for the development of complex laboratory activities. Can be called on to design and manage the fabrication of laboratory apparatuses/equipment.

**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

- Completion of a Bachelor's degree, Master's degree, in Mechanical, Mechatronics, Civil, Systems Design Engineering with a combination of industrial and academic experience.
- The incumbent must possess a Professional Engineering designation which is necessary to satisfy new Canadian Engineering Accreditation Board (CEAB) requirements that specify engineering design instruction can only count towards accreditation if it is performed by an instructor with a license from Professional Engineers Ontario (PEO).
- Multi-disciplinary education and experience is a valued asset.

Experience

- The Design Engineer must be a senior subject matter expert. Given the broad-based and in-depth technical expertise required to resolve ill-defined and highly unstructured problems that surface regularly, the incumbent must have extensive practical and theoretical knowledge acquired through multi-disciplinary engineering experience such as industrial- mechanical, mechatronics, civil-structural, medical and applied software systems.
- Teaching and capstone project supervision experience
- Management of staff personnel
- Project management with both industrial and academic settings
- In-depth CAD and CNC experience
- Cognizance of current teaching pedagogy
- Experience an asset with company startup, incorporation, patents, commercial and medical product design, commercial product development launch
- Experience with experimental laboratory research.

Knowledge/Skills/Abilities

- Wide knowledge base, especially for supervising capstone projects and design reviews that cover a wide variety of technical topics
- The Design Engineer must be highly competent in the theory taught in the design courses in which they are directly involved and have an oversight of the course material taught and/or supported by the four Clinic Engineers, as well as their two ongoing technical support co-operative positions.
- The Design Engineer has overall accountability for the design and fabrication of lab apparatus and thus, is required to have detailed knowledge of hardware and software.
- The Design Engineer must also be knowledgeable in the theory taught in the core lab courses offered by MME.
- Detailed knowledge of the engineering design process, mechanical systems, engineering graphics standards
- Ability to engage students and impart knowledge over long instructional periods
- Creative problem solving, can find solutions to challenging technical problems as well as ways methods to inject creativity/lateral thinking into engineering classrooms, clinics and laboratories
- Managerial and leadership abilities
- Ability to handle a high a work load that include preparing and delivering numerous weekly 3-hour teaching sessions while managing staff and balancing many competing job requirements
- Ability to adapt and change to current technology and pedagogy

Nature and Scope

- **Contacts:** MME faculty and staff, large numbers of MME undergraduate and graduate students, staff/students from other UW engineering departments, associates from other universities and industry, commercial vendors. Must be able to effectively communicate with people at all levels of expertise and relate to students while in an instructional role.
- **Level of Responsibility:** The position has specialized work under minimal supervision and is responsible for managing direct reports. This includes supervision of technical staff professionals, course instruction and ongoing interaction with large classes, TA supervision, final year design project instruction and advisory roles that also encompass planning/hosting the ME capstone symposium. The incumbent must act independently in determining solutions, but where needed consults with various UWaterloo leadership to seek resolution. Also, when necessary, reports situations to the MME department Chair for action and resolution.

- **Decision-Making Authority:** The incumbent must work independently with a high level of initiative and flexibility. The job requires regular independent action within defined policy parameters to provide informed advice and instruction to all stakeholders. Given the broad-based and in-depth technical expertise required to resolve ill-defined and highly unstructured problems that surface regularly, the incumbent must have practical and theoretical knowledge acquired through a multi-disciplinary engineering background. The impact and scope of these duties requires the use of discretion and judgement. The incumbent must be able to make thoughtful, informed and rational decisions to resolve issues or problems that arise. They will make staffing decisions typical of those associated with a management position, in conjunction with the MME department Chair. They are responsible for staff supervision and workload balancing, including assessing work performance and taking corrective action. The incumbent has teaching assignments and makes decisions typical of those associated with the role of an undergraduate instructor.
- **Physical and Sensory Demands**: The incumbent must possess clear communication skills and patience in cross-cultural interactions with an international clientele.
- **Working Environment:** Minimal exposure to disagreeable physical conditions typical of a supervisory/instructional position. High volume of work, constant interruptions, and time-sensitive decision-making are routine. Scheduling demands necessitate additional and after hours work during fall/winter terms.