Computer Hardware Engineer

ROLE OVERVIEW

You are the lead technical designer and developer of computer hardware and/or network systems.

As a computer hardware engineer you are responsible for overseeing the research, design, development, evaluation, and integration of computer and telecommunications hardware and related equipment, and information and communication system networks. You are expected to maintain an up-to-date knowledge base of related discipline, acting as the go-to for all aspects of hardware and systems architecture.

You may work in a variety of different industries, researching, developing, and testing computer or computer related components and systems for commercial, industrial, military, or scientific use. You will work towards understanding the client's needs, conducting extensive research into the feasibility of the project. Examining the costs, technical specifications, and potential risks of production.

You must have exceptional attention to detail and analytical skills to be successful as a computer hardware engineer. You must have an iterative approach to problem solving, understanding the importance of validating and verifying results to ensure accuracy. Although a technical skill set is highly important, you must also have the interpersonal skills to supervise junior engineers and technicians, in addition to managing the expectations of customers and stakeholders.

STRATA LEVEL: 3B – Technical Specialist

Also Known as:

- Computer Hardware Engineer
- Hardware Circuit Board Designer
- Telecommunications Hardware Engineer
- Hardware Technical Architect

Education and Experience:

- A bachelor's degree in computer engineering, electrical or electronics engineering, engineering physics or computer science.
- Preferably a master's or doctoral degree in a related engineering discipline.
- Licensed by a provincial or territorial association as a Professional Engineer (P.Eng.).

Associated NOC(s):

- **2147** – Computer Engineer, Hardware

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# TECHNICAL

IT Hardware and Systems Research

Research and updates knowledge and skills related to computer hardware and systems to keep up with technological advancements and recommend latest innovations or product improvements.

- Conducts comprehensive review of information and publications to ensure a complete understanding of a subject prior to development.
- Prepares a comparative evaluation of relevant literature to evaluate design options for clients.
- Research emerging aspects in related engineering disciplines to recommend new tools and procedures when available.
- Assesses user requirements prior to undertaking projects to develop components or systems architecture to meet user needs.

Hardware Feasibility Assessment

Assesses and evaluates computer hardware systems and components to determine the feasibility of new or existing hardware configurations to meet user requirements, and client goals (internal and external).

- Assess hardware and system requirements to develop overarching architecture and models.
- Evaluate different platforms for hardware solutions to make recommendations based on requirements and constraints.
- Evaluate the impact of potential security anomalies to determine appropriate mitigation solutions.
- Compares performance potential of similar systems to assess potential hardware configurations.
- Confers with other engineering staff to evaluate interface between hardware, software, operational, and performance requirements of system.

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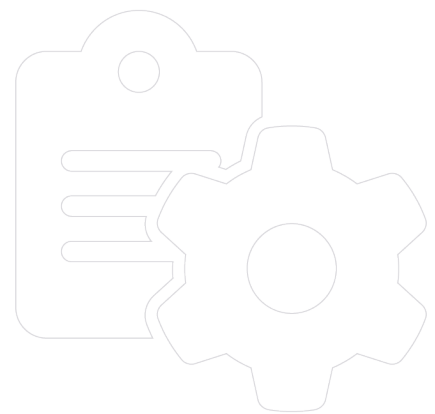
IT Hardware Design

Designs and develops computer hardware systems and components to improve technologies and user experience.

- Use computer-aided design (CAD) systems to assist in the creation, modification, analysis, or optimization of a design.
- Use computer-aided manufacturing (CAM) programmes to control machinery and machine tools in the creation, modification, analysis, or optimization of computer hardware components.
- Defines the engineering-related problem or opportunity and potential risk and benefits of project proposal[s] clients or stakeholders so that project can be approved and implemented.
- Specify materials and system requirement layouts to select hardware technology to integrate with existing technologies and IT environments.
- Develops detailed design layouts and diagrams for hardware components to specify the construction process in line with best standards.
- Liaises with external suppliers to specify hardware solutions in line with system requirements to ensure all hardware components and system designs function according to safety and regulatory requirements.
- Adjust engineering designs of computer or computer related products to ensure they meet user requirements.
- Implements design features to protect against tampering, intellectual property theft, reverse engineering, and other malicious attacks.

Prototype Development

Design prototypes of products or components of products by applying design and engineering principles to showcase the future product and test potential innovations to enhance market competitiveness.

- Applies working or theoretical models throughout the design, testing, and modification process to test again product prototypes.
- Leads the development of an early model to test concepts and replicability of hardware or systems.
- Presents prototype[s] to client or key stakeholders to obtain feedback on design and expectations to improve on the working model.
- Integrates feedback form client and test data to refine prototype to improve end design.

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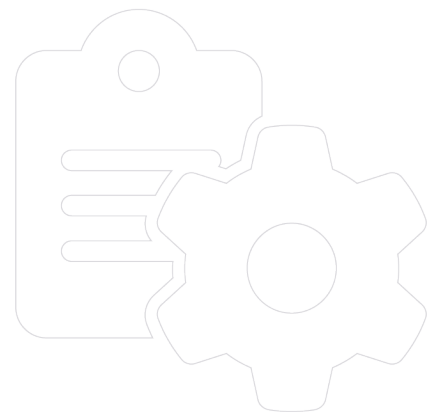
IT Systems Testing

Conducts simulations, tests, or modelling of product or system solutions to determine strengths and weaknesses of design, improve design solutions, and ensure reproducibility.

- Develops test plans, cases, and simulations to verify system requirements and to identify any defects in the IT system.
- Creates test scenarios under regular and irregular conditions to develop test data to analyze system requirements.
- Interprets and analyzes data collected during testing to formulate conclusions, new insights, or solutions.
- Perform functional, non-functional, load, and user experience testing of systems to verify the solution operates in compliance with organisational requirements.
- Create usability tests for users to interact with system interfaces to address usability issues and collate feedback results.
- Identify and document bugs and other issues to undertake problem investigation to establish root cause of problems and recommend solutions.

IT Infrastructure Integration

Merges component sub systems into one system to ensure that the sub systems function together as a complete system.

- Develop deployment models and prototyping of systems prior to installation to aid planning and develop domain awareness.
- Evaluate risks and impacts to IT deployment to ensure deployment does not interfere with existing infrastructure or data.
- Carry out deployment and installation of devices and hardware/software infrastructure in line with the deployment plan and organisational requirements.
- Implement and configure software services including data integration, cloud service integration and communications to align with IT solution requirements.
- Aligns system design and technical specifications with software architecture to ensure interoperability between components of the system.
- Coordinates with other technical staff and contractors to support continuous integration to support releases and improvements.

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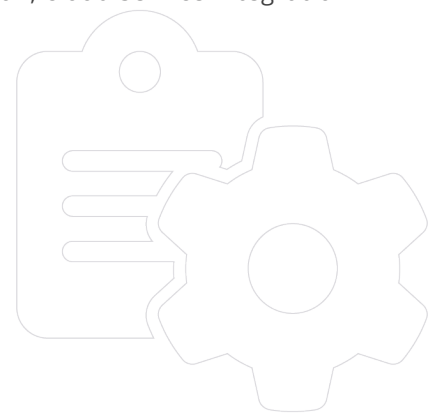
Project Team Management

Oversees a team of professionals to effectively and efficiently produce the required output to ensure project[s] are completed on time and budget.

- Provides direction and supervision to engineers, technicians, and technologists in the design and development process to ensure clear and effective channels of communication across all departments.
- Monitors and controls the allocation of resources and reassigns staff as needed to support project deliverables.
- Sets clear accountability targets for supervised personnel to achieve project deliverables.
- Manage tasks and projects according to approved scopes of work to deliver quality reports on schedule and within budget.

Network Security

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- Applies different network protocols at different layers
- Protects networks from unauthorized access using the appropriate policies in conjunction with the underlying computer network infrastructure.

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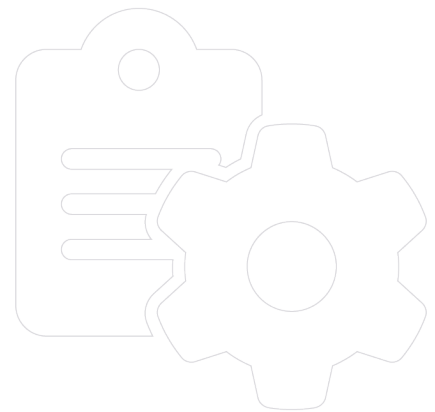
PERSONAL AND PROFESSIONAL

Communication

Positively directs outcomes by delivering communication that results in a better understanding of goals and objectives and that capture interest and gain support for immediate action.

- Maintains communications with the team, as well as external stakeholders, to exchange information, assess progress and reassign work as needed.
- Provides clear instructions, information, and duties to supervised employees to ensure employees clearly understand their position.
- Leads presentations to technical and non-technical colleagues and clients to convey project plan and progress.
- Explains novel or complex engineering concepts and related facts in an appropriate manner to an audience to explain aspects of the design process and/or proposal.
- Develop and maintain relationships with clients and customers to ensure optimum customer service and maintenance of contract requirements.

Problem Solving

Identifies problems and uses logic, judgement, and evidence to evaluate alternative scenarios and recommend solutions to achieve a desired goal.

- Simplifies complex ideas and technical concepts into accessible information to communicate with stakeholders, senior management, and team members.
- Takes an unbiased stance to interpreting new information to solve a problem in an object manner.
- Defines engineering related problem and analyzes potential solutions to solve the problem.
- Identifies relationships between components and systems to come up with solutions to resolve problems.
- Applies logical and iterative analysis to evaluate events and outcomes.

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Attention to Detail

Reviews completed work by monitoring and checking information, organizing tasks and resources efficiently, or all areas involved towards the completion of an objective.

- Scrutinizes models, tests, and simulation results to ensure validity and accuracy in results or findings.
- Routinely expresses concern that procedures and standards are followed thoroughly in the completion of a task[s].
- Double checks the accuracy of information and work to provide accurate and consistent work.
- Catches and corrects own errors or omissions, where applicable, to ensure efficiency and safety.

LEGAL, REGULATORY, AND POLICY

Regulatory Compliance

Adheres to specific regulations, codes, and legislation within a defined jurisdiction to ensure the health and safety of others.

- Monitor and evaluate changes to privacy and data protection laws and regulations to maintain organizational compliance.
- Manage Records of Processing Activities to document all processing of personal data.
- Contributes to organizational guidance on privacy obligations and ethical requirements of employees.
- Critically analyze legislation, regulations, and policies as they relate to IT architecture and systems to ensure organizational compliance.
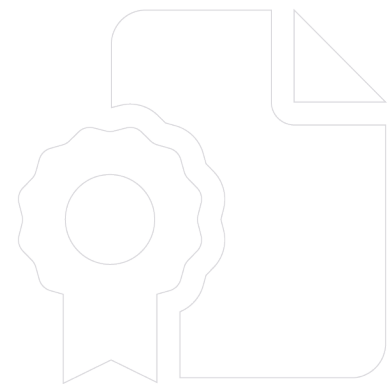
ENVIRONMENTAL

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