OCCUPATIONAL STANDARD
SPECIFYING KNOWLEDGE, SKILLS & BEHAVIOURS

Occupation: Digital Technologies Professional – Undergraduate Degree Level

Typical Job Titles:	Software Developer, Application Developer, Cyber Security Analyst, Information Management Specialist, Data Scientist, Systems Designer
Duration:	Typically, 48 months
Award	BASc (Hons) in Digital Technologies

Role Profile

A Digital Technology Professional provides technology-enabled solutions to internal and/or external clients, in a range of areas including software development, information technology systems analysis and development, cybersecurity, and data analysis.

They implement technology solutions that enable businesses to develop new products and services and to increase an organization's productivity using digital technologies. They are confident, competent and capable independent professionals able to operate in a range of related roles. This standard is based upon a core set of knowledge, skills and behaviours that will be supplemented by one of the specialisms detailed below.

Core Technical Knowledge

Knows and understands:

1. **Business Context and Program Management**

    - CTK1a: How to use digital technology to implement, enhance, and/or catalyze business strategy
    - CTK1b: The various roles, functions and activities related to the development, delivery and operation of technology solutions within an organization.
    - CTK1c: How to deliver a technology solutions project accurately, consistent with business needs, recognizing mission-critical and reliability requirements.
    - CTK1d: How issues of quality, cost (including time), and resource constraints lead to trade-offs that impact project success

2. **Infrastructure and Development Approaches**

- CTK2a: How teams, including holistic product lifecycle (or single stack) teams, work effectively to produce technology solutions.
- CTK2b: Development methodologies, design patterns and contemporary best practices for design, developing, testing, correcting, deploying and documenting software systems from specifications, using agreed standards and tools.
- CTK2c: Infrastructure and how businesses use cloud services; the role of infrastructure as a service, platform as a service, and software as a service.
- CTK2d: Threat landscape frameworks, Security and Privacy by Design principles, common vulnerabilities in applications and computer networks including unsecure coding and unprotected networks.
- CTK2e: The role and use of data as a key organizational resource, common contemporary methods for organizing and using data, its governance, and how to extract meaningful and actionable insights, including through AI and machine learning techniques.

Core Technical Skills

- **CTS1a: Software Development:** analyses business and technical requirements to select and specify appropriate technology solutions. Designs, implements, tests, and debugs software to meet requirements, including user experience, using contemporary best practices including agile/scrum development methodologies and common design patterns where appropriate.
- **CTS1b: Software Management:** manages the development and assurance of software artefacts using industry-standard build processes and tools for version control and configuration management, applying secure development practices to ensure system resilience. Configures and deploys solutions to end-users. Maintains code, including navigating legacy systems.
- **CTS1c: Information/Data Management:** identifies organizational information requirements and can model data solutions using a variety of conceptual modelling techniques and data architectures. Can choose and implement an appropriate and scalable solution. Can manage data effectively, including key concepts of data quality and data security, integration of different systems, and undertake data analysis (querying, producing reports, etc.)
- **CTS1d: Cyber and Data Security:** can undertake a security risk assessment for a simple IT system, prioritize vulnerabilities, and propose resolution advice. Can identify, analyze and evaluate security threats and hazards to planned and installed information systems or services (e.g., Cloud services) using, for example, an EDR tool. Can perform simple network security functions (e.g., ping, check port, etc.)

Core Behavioural Skills

Professional, Interpersonal and Business Skills	Attributes and Behaviours
1. **Teamwork and Communication** • CBS1a: Able to work effectively in teams, including multidisciplinary and multi-teamed enterprise environments.	• CBS3a: Demonstrates initiative, passion, and curiosity. • CBS3b: Demonstrates aptitude for life-long learning, able to self-learn to solve new problems.

- CBS1b: Competent in active listening and in leading, influencing and persuading others.
- CBS1c: Able to articulate complex issues to a variety of audiences through concise, engaging and well-structured arguments and explanations using multiple modes of communication (including video and online).
- CBS1d: Able to exercise basic leadership skills; understands basic management concepts; can identify the preferences, motivations, strengths and limitations of other people and apply these insights to work more effectively with and to motivate others.
- CBS1e: Able to give and receive feedback constructively.
- CBS1f: Able to put forward, demonstrate value and gain commitment to a moderately complex technology-oriented solution, demonstrating understanding of business need, using open questions and summarising skills and basic negotiating skills.

2. **Personal Work-related skills**
- CBS2a: Takes ownership/responsibility for own work, and is accountable, within the context of a collaborative environment.
- CBS2b: Able to prioritize own work to meet required outcomes.
- CBS2c: Aware of dependencies of own work, recognizing the outcome/impact of work on own team, other teams, and the enterprise context.
- CBS2d: Applies analytical and critical thinking skills to Technology Solutions development and to systematically analyze and apply structured problem-solving techniques to complex systems and situations.
- CBS2e: Able to negotiate with and influence others, recognizing and valuing competing interests, to arrive at consensus that is in the best interests of the organization.
- CBS2f: Able to conduct effective research, using literature and other media, to discover emerging technologies and analyze and explain the potential business use case.
- CBS2g: Understands importance of and how to support diversity and inclusion and how to

- CBS3c: Demonstrates mastery of basic business disciplines, ethics and courtesies.
- CBS3d: Demonstrates timeliness and focus when faced with distractions, and the ability to complete tasks to a deadline with high quality.
- CBS3e: Flexible attitude, values ideas rather than ownership.
- CBS3f: Resilient in face of challenges; adaptable.
- CBS3g: Demonstrates logical thinking and a creative approach to problem solving.

constructively resolve conflicts, particularly in teams	

Specialism Outcomes

Each of the specialisms is set out below. All learners will require the core skills and knowledge to be combined with one of the specialist skills and knowledge to be able to operate effectively in the defined role. The employer will select one of the specialisms for the learner which is specific to the role the learner will be performing.

Specialism Title	Software Developer

Role Details

The primary role of a software developer is to be able to design, build and test high-quality software solutions. The software developer is responsible for all stages of the software development process, from requirements, analysis and design, development and data requirements whilst ensuring security robustness is built in. They are aware of product maintenance and deployment approaches and the automation of such processes. They will typically be working as part of a larger collaborative team and will have responsibility for significant elements of software projects.

Technical Skills

Is able to:
- SD1a: Create effective and secure software solutions using contemporary software development languages to deliver the full range of functional and non-functional requirements using relevant development methodologies.
- SD1b: Work end-to-end, and in-depth in at least one area.
- SD1c: Undertake analysis and design to create artefacts, such as use cases, to produce robust software designs.
- SD1d: Produce high quality code with sound syntax in at least one programming language following best practices and standards.
- SD1e: Perform code reviews, debugging and refactoring to improve code quality and efficiency.
- SD1f: Ensure requirements have been met using industry-standard methodologies (e.g. BDD, TDD, ATDD); employ testing methodologies such as use case and usability testing to ensure functional and non-functional requirements

Technical Knowledge

Knows and understands:
- SD2a: How to operate at all stages of the software development lifecycle.
- SD2b: Front-end development and user experience design principles.
- SD2c: Back-end development and design of business and data models.
- SD2d: How teams work effectively to develop software solutions embracing agile/scrum and other development approaches.
- SD2e: How to apply software analysis and design approaches.
- SD2f: How to interpret and implement a design, compliant with functional, non-functional, security, and quality assurance, reliability and safety requirements.
- SD2g: How to perform functional and unit testing.
- SD2h: How to use and apply the range of software tools used in Software engineering.
- SD2i: How to build a scalable solution, recognizing the interactions with other existing systems.
- SD2j: The fundamentals of data structures, database system design, implementation and maintenance.

have been met including quality assurance, reliability, and safety requirements. • SD1g: Use and modify industry-standard tools that support the ongoing needs of the organization, such as automating manual processes • SD1h: Interfacing simple hardware and peripheral devices by developing corresponding firmware or utilizing Application Programming Interface.	• SD2k: Open-source development principles and processes

Specialism Title	Cyber Security Analyst

Role details
A cyber security analyst is responsible for the implementation, maintenance and support of the security controls that protect an organization's systems and data assets from threats and hazards. They ensure that security technologies and practices are operating in accordance with the organization's policies and standards to provide continued protection. They require a broad understanding of network infrastructure, software and data to identify where threat and hazard can occur. They are responsible for performing periodic vulnerability assessments to evaluate the organization's ongoing security posture and will provide visibility to management of the main risks and control status on an ongoing basis. They respond to security incidents and implement resolution activities across the organization.

Technical Skills	**Technical Knowledge**
Is able to: • CSA1a: Analyze and evaluate security threats and vulnerabilities to planned and installed information systems or services (including cloud services) and identify how these can be mitigated against. • CSA1b: Perform security risk assessments for a range of information systems, including operational technologies, and propose solutions. • CSA1c: Perform penetration testing and use an offensive security toolset. • CSA1d: Develop risk mitigation strategies against prioritised security threats and recommend security controls and appropriate processes • CSA1e: Implement security controls and processes in response to risk assessment and identified security cases.	Knows and understands: • CSA2a: Role of digital identity, data security and data loss prevention, identity and access management, privileged access management. • CSA2b: The types of security (confidentiality, authentication; non-repudiation; service integrity) and security big picture (network security; host OS security; physical security), including zero-trust architecture. • CSA2c: The main types of common attack techniques, including phishing, social engineering, malware, network interception, blended techniques, denial of service and theft. • CSA2d: how data analysis and AI is used in offensive and defensive technologies • CSA2e: How to recognize and assess risk including performing a risk assessment. • CSA2f: How to apply penetration testing effectively and how it contributes to assurance.

• CSA1f: Define and justify a user access policy for an information system given knowledge of the system architecture, security requirements and threat/risk environment. This should be in terms of what the user can do, resources they can access, and operations they are allowed to perform. • CSA1g: Perform a business impact analysis in response to a security incident and follow a disaster recovery plan to meet elements of a given business continuity policy. • CSA1h: Conduct a range of cyber security audit activities to demonstrate security control effectiveness.	• CSA2g: Different approaches to risk treatment and management used in practice, such as avoidance, retention, sharing, transferring. • CSA2h: How to build and sustain a culture of security and privacy by design, and manage security risks based on organizational values and culture, recognizing how human behaviour contributes to the security landscape.

Specialism Title	Data Scientist

Role Details

The primary role of a data scientist is to collect, organize and study data to provide new business insight. They are responsible for providing up-to-date, accurate and relevant data analysis for the organization, using up-to-date tools such as AI/ML. They understand the patterns and paradigms by which data is used, and are typically involved with managing, cleansing, abstracting and aggregating data across the network infrastructure. They have a good understanding of data structures, software development procedures, mathematical statistics and the range of analytical tools used to undertake a wide range of standard and custom analytical studies, providing data solutions to a range of business issues. They document and report the results of data analysis activities making recommendations to improve business performance. They need a broad grounding in technology solutions to be effective in their role.

Technical Skills	**Technical Knowledge**
Is able to: • DS1a: Import, cleanse, transform, and validate data with the purpose of understanding or making conclusions from the data for business decision making purposes. • DS1b: Present data visualization using charts, graphs, tables, and more sophisticated visualization tools. • DS1c: Perform routine statistical analyzes and ad-hoc queries.	Knows and understands: • DS2a: How organizations use data, including for automating processes • DS2b: The organization's data architecture. • DS2c: Use of unstructured data and AI/machine learning approaches • DS2d: The quality issues that can arise with data and its analysis, including ethical issues and practices for AI, and how to avoid and/or resolve these. • DS2e: The processes involved in carrying out data analysis projects.

• DS1d: Use a range of analytical techniques such as data mining, time series forecasting and modelling techniques to identify and predict trends and patterns in data. • DS1e: Report on conclusions gained from analysing data using a range of statistical software tools. • DS1f: Summarise and present results in diverse ways (including such as analogies and anecdotes), as evidence for recommendations, to a range of stakeholders.	• DS2f: How to use and apply industry-standard tools and methods for data analysis. • DS2g: The range of data protection and legal issues. • DS2h: The fundamentals of data structures, database system design, implementation and maintenance.