European Foundational Body of Knowledge for the ICT Profession (ICT BoK)

DRAFT v1 for ICT BoK EXPERT NETWORK REVIEW – 26 October 2020
ICT BoK overview & Knowledge Units (KUs) full description

KNOWLEDGE DOMAINS	1. Transversal knowledge	2. Behavioural Knowledge	3. Architecture	4. Networks	5. Software	6. Data	7. Business
KNOWLEDGE UNITS							
(1) Accessibility [T1]	X						
(2) Application Software					X		
(3) Business processes							X
(4) Collaboration		X					
(5) Communication		X					
(6) Data analytics						X	
(7) Data communication					X		
(8) Data management						X	
(9) Digitalisation							X
(10) Documentation							X
(11) Enterprise architecture			X				
(12) Ethics [T2]	X						
(13) ICT governance							X
(14) ICT and society							X
(15) ICT Infrastructure			X				
(16) ICT in organisations							X
(17) ICT legal issues [T3]	X						
(18) ICT project management							X
(19) ICT Quality							X
(20) ICT risk management							X
(21) ICT strategy							X
(22) Information analysis							X
(23) Information planning							X
(24) Information systems development & implementation					X		
(25) Knowledge and information management						X	
(26) Leadership		X					
(27) Networks and network services				X			
(28) Organisation principles							X
(29) Privacy [T4]	X						
(30) Problem solving		X					
(31) Programming languages					X		
(32) Programming principles					X		
(33) Requirements analysis and specifications					X		
(34) Security [T5]	X						
(35) Service delivery and support							X
(36) Software design					X		
(37) Sourcing							X
(38) Sustainability [T6]	X						
(39) System administration					X		
(40) System Software					X		
(41) Testing					X		
(42) Usability [T7]	X						
(43) User interface and web design					X		

UNIT NAME	ACCESSIBILITY [T1] (1)			
Unit description	The Accessibility knowledge unit concerns knowledge about the extent to which the design of products, devices, services or environments are usable by all, irrespective of personal capacities. It relates to the extent to which products, systems, services, environments and facilities may be used by people with the widest range of characteristics and capabilities to achieve specified goals. Accessibility is a transversal aspect relevant to all ICT professional activities.			
Common Knowledge	This unit incorporates cross-cutting knowledge directly related to the e-CF transversal aspect, 'T1 – Accessibility'. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation and wider society, including the following topics: • The general principles of accessibility and the reasons for ensuring digital accessibility • An understanding of the level of compliance required by public bodies with WCAG guidelines • General methods for generating and managing accessible digital information			
Tags for views	**Knowledge Domain** 1. Transversal knowledge	**EN16234-1 e-CF area(s)** A. PLAN B. BUILD	**EN16234-1 e-CF Competence(s)** A.6. Application Design B.1. Application Development A.10 User Experience	**ICT Professional Role Profile(s) CWA16458-1** Developer Role (6) Digital Media Specialist Role (7)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • ICT accessibility standards and guidelines • Principles of accessibility, Universal Design and Accessible Design • Content editing and postproduction of accessible texts and multimedia • Relevant tools and technologies (e.g. assistive technologies, publication tools) • Accessibility evaluation tools and checks • Behavioural science principles • Human-computer interaction principles			
Specialised Knowledge	More in-depth knowledge of the accessibility is articulated in specialised frameworks, standards, international and national guidelines and regulations.			
References	• prEN XXXX:XXXX ICT accessibility competences — Guidelines for a more inclusive ICT • ISO/IEC 40500: Information technology — Web Content Accessibility Guidelines (W3C-WCAG) • ISO/IEC 29138: Information technology — User interface accessibility • ISO/IEC 30071: Information technology — Development of user interface accessibility https://www.iso.org/standard/70913.html • ISO 9241: Ergonomics of Human System Interaction – part 151: Guidance on World Wide Web user interfaces – part 171; Guidance on software accessibility • ETSI EN 301 549: Accessibility requirements for ICT products and services • WAMDIA reports https://wamdia.eu/en/ • European Accessibility Act, EU Web Accessibility Directive			

UNIT NAME	APPLICATION SOFTWARE (2)			
Unit description	The Knowledge Unit Application Software contains knowledge about software designed to help users perform specific information processing tasks or activities. This can be in a variety of contexts, for example, the assistance of people while performing business activities, such as word processing or project management,			
Common Knowledge	All ICT professionals should understand the fundamentals of application software as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Concept of software as a series of instructions • Application software as one the major categories of software, compared to operating system software • Role of application software • Categories of application software and their different functions • Embedded software, web-based software • Examples of most widely used application software			
Tags for views	**Knowledge Domain(s)** 3. Software	**EN16234-1 e-CF area (s)** A. PLAN B. BUILD	**EN16234-1 e-CF Competence(s)** A.6. Application Design B.6. Systems Engineering	**ICT Professional Role Profile(s) CWA16458-1** Developer Role (6) Systems Analyst Role (20) Solution Designer Role (24)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following key topics: • Availability of application software, e.g. packaged, custom, web, open source, shareware, freeware, public domain • Features, functions, and possibilities of different types of application software • Characteristics of a user interface • Key features of widely used business programs, graphics and multimedia programs • Learning aids available for application software			
Specialised Knowledge	More in-depth knowledge of application software is further articulated in specialised certifications.			
References	• Supplier specific			

UNIT NAME	BUSINESS PROCESSES (3)			
Unit description	The Business process knowledge unit concerns knowledge about organisation of work into business activities that are usually cross-functional and represent the steps required to achieve business objectives. The objective is to deliver organisational or customer value. It includes knowledge related to the flow and use of information and resources.			
Common Knowledge	All ICT professionals should understand the fundamentals of business processes as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Process thinking • Different types of business processes and their focus (e.g. primary, supporting, management) • Process models (e.g. Value chain, input-process-output model) • Basic process modelling techniques (e.g. flow charts, Gantt charts) •			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area(s)** A. PLAN E. MANAGE	**EN16234-1 e-CF Competence(s)** A.1 IS and Business Strategy Alignment E.5. Process Improvement	**ICT Professional Role Profile(s) CWA16458-1** Business Analyst Role (2) Enterprise Architect Role (8) ICT Operations Manager Role (10)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Process modelling, analysis and design • Process modelling techniques (e.g. PERT, BPMN) • Process performance management • Process improvement Business Process Redesign/Reengineering			
Specialised Knowledge	More in-depth knowledge of business processes is further articulated in specialised BoKs, standards, and models.			
References	• Association of Business Process Management Professionals Common Body of Knowledge® (ABPMP CBOK®) • Business Analysis Body of Knowledge (BABOK)(IIBA) • ISO/IEC 19510 IT – OMG Business Process Model and Notation • Value chain model (Porter)			

UNIT NAME	COLLABORATION (4)			
Unit description	The Collaboration knowledge unit concerns knowledge related to working with others in common purpose to achieve mutual goals. It incorporates teamworking, networking with others, negotiation, and the avoidance and/or resolution of conflict.			
Common Knowledge	All ICT professionals should understand the fundamentals of collaboration as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to working relationships and ICT in the organisation, including the following topics: • An understanding of a shared purpose • General principles of collaboration and basic models • General notion of issues in collaboration and teamwork (e.g. mediation, negotiation conflict handling, networking)			
Tags for views	**Knowledge Domain** 2. Behavioural knowledge	**EN16234-1 e-CF area(s)** E. MANAGE	**EN16234-1 e-CF Competence(s)** D.8. Contract management E.2. Project and Portfolio Management E.4. Relationship Management	**ICT Professional Role Profile(s) CWA16458-1** Account Manager Role (1) Project Manager Role (15) Service Manager Role (18) Devops Expert Role (26)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Networking and managing relationships • Mediation and negotiation • Conflict handling • Group dynamics, group thinking • Teamwork (e.g. types of teams, processes, relationships, roles, team building) • Models of collaboration and teamwork			
Specialised Knowledge	More in-depth knowledge of collaboration is further articulated in specialised BoKs, standards, and models.			
References	• ISO 44001: Collaborative business relationship management systems — Requirements and framework https://www.iso.org/standard/72798.html • Digital Practitioner Body of Knowledge™ Standard (Context II: Team) (The Open Group) https://pubs.opengroup.org/dpbok/standard/DPBoK.html#the-BoK • Models, such as: FNSP - Forming-Storming-Norming-Performing model (Tuckman), GRPI - Goals, Roles, Processes, Interpersonal relationships model (Rubin, Plovnick and Fry)			

UNIT NAME	COMMUNICATION (5)
Unit description	The Communication knowledge unit concerns knowledge related to the exchange of information, ideas, emotions, facts and concepts to another person or group of individuals. The unit incorporates the application of all communication media, including speech, writing and electronic transmission of information both formal and informal.
Common Knowledge	All ICT professionals should understand the fundamentals of communication as articulated in the unit description. Each ICT Professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Basic principles of communication • Formal and informal communication • Professional written and oral communication • Listening techniques

Tags for views	Knowledge Domain	EN16234-1 e-CF area(s)	EN16234-1 e-CF Competence(s)	ICT Professional Role Profile(s) CWA16458-1
	2. Behavioural knowledge	D. ENABLE	D.3. Education and Training Provision D.6. Digital Marketing	Account Manager Role (1) Digital Media Specialist Role (7) Digital Consultant Role (9) Digital Educator Role (13)

Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Communication models • Communication techniques • Oral communication (e.g. conversations, meetings, presentations) • Written communication for different types of reports and documents • Electronic communication (e.g. e-mails, text, social media) • Non-verbal communication through body language • Visualisations through graphs and charts • Different communication styles for different purposes and situations, people and media
Specialised Knowledge	More in-depth knowledge of communication is further articulated in specialised BoKs, and models.
References	• Technical Communication Body of Knowledge (TCBOK) (Society for Technical Communication (STC) https://www.tcbok.org/ • Global Body of Knowledge standard for Public relations and Communication management (GBOK) (Global Alliance for PR and Communications) • Shannon-Weaver Model of Communication

UNIT NAME	DATA ANALYTICS (6)			
Unit description	The Knowledge unit Data Analytics contains knowledge about appropriate analytics and statistical techniques on available data to discover new relations and deliver insights into research problem or organizational processes and support decision-making.			
Common Knowledge	All ICT professionals should understand the fundamentals of Data Analytics as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Business Intelligence • Big data • Dashboard			
Tags for views	**Knowledge Domain** 6. Data	**EN16234-1 e-CF area(s)** D. ENABLE E. MANAGE	**EN16234-1 e-CF Competence(s)** D.7. Data Science and Analytics E.1. Forecast Development	**ICT Professional Role Profile(s) CWA16458-1** Data Scientist Role (27) Data Specialist Role (28)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following key topics: • Statistical methods for data analysis • Machine learning • Data Mining • Prescriptive and Predictive Analytics • Modeling, simulation and optimisation			
Specialised Knowledge	More in-depth knowledge of Data Analytics is further articulated in specialised BoKs and standards.			
References	• Edison Data Science Framework • DMBOK			

UNIT NAME	DATA COMMUNICATION (7)			
Unit description	The Knowledge unit Data Communication contains knowledge about the transfer of data from one place another of between participating parties for storage and processing by computers to enable the movement of electronic data between two or more network nodes.			
Common Knowledge	All ICT professionals should understand the fundamentals of Data Communication as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Message • Sender/Receiver • Transmission medium			
Tags for views	**Knowledge Domain** 4. Networks	**EN16234-1 e-CF area(s)** C. RUN	**EN16234-1 e-CF Competence(s)** C.2. Change Support C.3 Service Delivery C.4 Problem Management	**ICT Professional Role Profile(s) CWA16458-1** Technical Specialist Role (22)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following key topics: • Radio transmission e.g. Radio, Cable • Infrared • Fiber optics • Cable technology e.g. STP, UTP, FTP • Line technology e.g. ADSL, ISDN • Cable types e.g. COAX			
Specialised Knowledge	More in-depth knowledge of Data Communication is further articulated in specialised BoKs and standards.			
References	Supplier specific			

UNIT NAME	DATA MANAGEMENT (8)			
Unit description	The Knowledge unit Data Management contains knowledge about developing and implement data management strategies for data collection, storage, preservation, and availability for further processing to enable value creation from the data.			
Common Knowledge	All ICT professionals should understand the fundamentals of Data Management as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • File organisation • Documentation • Storage and backup			
Tags for views	**Knowledge Domain** 6. Data	**EN16234-1 e-CF area(s)** D. MANAGE E. ENABLE	**EN16234-1 e-CF Competence(s)** D.7. Data Science and Analytics E.9. IS Governance	**ICT Professional Role Profile(s) CWA16458-1** Data Administrator Role (5) Data Scientist Role (27) Data Analyst Role (28)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following key topics: • Data management systems • Data management infrastructures • Data governance • Big data • Digital libraries and archives			
Specialised Knowledge	More in-depth knowledge of Data Management is further articulated in specialised BoKs and standards.			
References	• Edison Data Science Framework • DMBOK			

UNIT NAME	DIGITALISATION (9)
Unit description	The Digitalisation knowledge unit knowledge related to the use of digital technologies and digital data to improve business processes and/or change business models to provide new revenue streams and value-adding opportunities. Digitalisation enables change in how organisations and society function through the application of new technologies. Within organisations this requires a digital strategy or a digital transformation.
Common Knowledge	All ICT professionals should understand the fundamentals of digitalisation as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Difference between digitalisation, digital transformation and digital strategy • Main technologies that drive digitalisation (e.g. A.I., RPA) • Application areas (e.g. FinTech, RegTech)

Tags for views	**Knowledge Domain**	**EN16234-1 e-CF area(s)**	**EN16234-1 e-CF Competence(s)**	**ICT Professional Role Profile(s) CWA16458-1**
	7. Business	A. PLAN E. MANAGE	A.1. Information Systems and Business Strategy Alignment A.7. Technology Trend Monitoring A.9. Innovating E.7. Business Change Management	Chief Information Officer Role (4) Digital Consultant Role (9) Digital Transformation Leader Role (25)

Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Digital business models • Methodologies for digital transformation projects (e.g. DevOps) • Industry 4.0 • Technologies used in digitalization (e.g. robotics, RPA, A.I., machine learning, Blockchain, IoT, XR, VR, AR, MR)
Specialised Knowledge	More in-depth knowledge of digitalisation is further articulated in specialised standards.
References	• IEEE Standards for Advanced Manufacturing, e.g. IEEE 2755, 1589 • ISO Blockchain standards, e.g. ISO 22739 • ISO/IEC IoT standards, e.g. ISO/IEC 21823, 30141, 27030 • ISO/IEC A.I standards, e.g. ISO/IEC 23053, 22989, 24027, 24368, 42001

UNIT NAME	DOCUMENTATION (10)		
Unit description	The Documentation Knowledge Unit contains knowledge about the creation of pieces of written, printed, or electronic matter that provides information or are used as an official record. It can also include the instructions, comments, and information for using a particular piece or system of computer software or hardware.		
Common Knowledge	All ICT professionals should understand the fundamentals of the Documentation Knowledge Unit as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Role of documents in key processes • Document retrieval		
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area(s)** A. PLAN B. BUILD	**EN16234-1 e-CF Competence(s)** B.5. Documentation Production A.4. Product / Service Planning	**ICT Professional Role Profile(s) CWA16458-1** Developer Role (6)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Organisational and legal documentation requirements • Documentation review and editing methods • Documentation quality standards • Visual communication methods • Version management • Content management systems • Documentation, information. content management standards • Corporate standards for publications • Document templates		
Specialised Knowledge	More in-depth knowledge of Documentation is further articulated in specialised BoKs and standards.		
References	• ISO 15489 Information and documentation -- Records management. 2016 • ISO 30300:2011 Information and Documentation – Management Systems for Records – Fundamentals and Vocabulary • https://www.arma.org/page/Standards		

UNIT NAME	ENTERPRISE ARCHITECTURE (11)			
Unit description	The Enterprise Architecture (EA) knowledge unit concerns knowledge about the arrangement of physical components, logical relationships, and human interactions of an enterprise and its governing principles such as plans, designs and controls for the realisation, integration and evolution of this enterprise and for the execution of organisational strategies. Enterprise Architecture practice underpins the organisations objective to implement IT projects, infrastructures and address policies, current, transitionary and through to future states, to achieve organisational goals.			
Common knowledge	All ICT professionals should understand the fundamentals of Enterprise Architecture as articulated in the unit description. Each ICT Professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Basic principles of Enterprise Architecture • The existence of various models • ICT components, software and hardware as part of the overall EA			
Tags for views	**Knowledge Domain** 3. Architecture	**EN16234-1 e-CF area(s)** A. PLAN	**EN16234-1 e-CF Competence(s)** A.1. Information Systems and Business Strategy Alignment A.5. Architecture Design	**ICT Professional Role Profile(s) CWA16458-1** Business Analyst (2) Enterprise Architect (8) Systems Architect (21)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Enterprise Architecture frameworks and models • Processes for developing enterprise architecture • Modelling methods (e.g. BPM) • Architecture modelling tool			
Specialised Knowledge	More in-depth knowledge of Enterprise Architecture is further articulated in specialised BoKs and standards.			
References	• ISO /IEC/IEEE 42020 **https://www.iso.org/standard/68982.html** • ISO 15704 • The Enterorise Architecture Body of Knowledge (EABok®) (EABOK Consortium) **https://eabok.org** • Mitre Guide to the (evolving) enterprise architecture body of knowledge **https://www.mitre.org/publications/technical-papers/guide-to-the-evolving-enterprise-architecture-body-of-knowledge** • TOGAF • Zachman • Gartner • GERAM			

UNIT NAME	ETHICS [T2] (12)			
Unit description	The Ethics knowledge unit concerns procedures, values and practices that govern ICT and its related disciplines that avoid damage to or violation of integrity, moral values or the fundamental beliefs of an individual, organisation or humanity. Ethics is a transversal aspect relevant to all ICT professional activities.			
Common knowledge	This unit incorporates cross-cutting knowledge directly related to the e-CF transversal aspect, 'T2 - Ethics'. All ICT professionals should understand the fundamentals of ethics as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Principles of professional ethics and their application as an individual • Code of Ethics within their organisation and/or a professional body • Implications of ethical principles for the general public, clients and employers			
Tags for views	**Knowledge Domain** 1. Transversal knowledge	**EN16234-1 e-CF area(s)** A. PLAN D. ENABLE E. MANAGE	**EN16234-1 Competence(s)** A.3. Business Plan Development D.7. Data Science and Analytics D.10. Information and Knowledge Management E.9. IS Governance	**ICT Professional Role Profile(s) CWA16458-1** Business Information Manager (3) Chief Information Officer (4) Digital Consultant (9) Digital Transformation Manager (25)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes ethical theories and methods of education and implementation of ethics into the organizations culture and processes, including the following topics: • Methods of integrating ethics into practices, processes. • Provoking good practice, going beyond mere compliance • Enabling the implementation of procedures and monitoring of progress. • Training and coaching methods to encourage staff.			
Specialised Knowledge	More in-depth knowledge of Ethics is further articulated in specialised BoKs and standards.			
References	• European Professional Ethics Framework for the ICT Profession Link to be provided, (the framework will enable the concepts to be implemented and integrated at individual professional and organizational level) • ACM Code of Ethics https://www.acm.org/code-of-ethics • Major link: concepts and also integration. Fill in more detail of key concepts.			

UNIT NAME	ICT GOVERNANCE (13)			
Unit description	The ICT governance knowledge unit concerns knowledge relating to evaluation, direction, and monitoring of the current and future application of an organisation's IT resources in support of strategic objectives. ICT governance is part of the organisations overall governance strategy and is aimed at improving the overall management of IT and deriving improved value from investment in information and technology.			
Common knowledge	All ICT professionals should understand the fundamentals of ICT governance as articulated in the unit description. Each ICT Professional should be aware of the relevance and context of this subject to ICT in the organisation including the following topics: • Basic principles of ICT Governance • Understanding personal role within GDPR compliance			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF areas(s)** A.PLAN E.MANAGE	**EN16234-1 e-CF Competence(s)** A.1. IS and Business Strategy Alignment A.3. Business Plan Development E.3. Risk Management E.9. IS Systems Governance	**ICT Professional Role Profile(s) CWA16458-1** Chief Information Officer Role (4) Enterprise Architecture Role (8) Digital Transformation Manager Role (25)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics; • Value delivery • Business, IT and strategic alignment • IT Service management • Performance management • Resource management (e.g. sourcing, outsourcing, vendor management) • Risk management • Change management			
Specialised Knowledge	More in-depth knowledge of ICT governance is further articulated in specialised BoKs and standards.			
References	• ISO/IEC 38500 Governance of IT for the organisation https://www.iso.org/standard/62816.html • COBIT® • ITIL			

UNIT NAME	ICT AND SOCIETY (14)			
Unit description	The knowledge unit ICT and society concerns knowledge about digital policy at a societal level and the potential ethical, social and economic implications (positive and negative) of ICT. It also concerns the role of the organisation in society in terms of corporate social responsibility.			
Common Knowledge	All ICT professionals should understand the fundamentals of ICT and Society as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation and wider society, including the following topics: • ICT impact in society • Concepts describing societal changes related to ICT, e.g. globalisation, information society, networked economy, information revolution, digital world • Market trends and needs related to IT • Approaches/ Methods for regulating and monitoring impact			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area(s)** A.PLAN E. MANAGE	**EN16234-1 e-CF Competence(s)** A.1. IS and Business Strategy Alignment A.8. Sustainable Development E.7. Business Change Management	**ICT Professional Role Profile(s) CWA16458-1** Digital Transformation Leader Role (25) Chief Information Officer Role (4)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Information policy and policy development process • Social models of society and power distribution • Stakeholder identification and communication techniques • Corporate social responsibility (CSR)			
Specialised Knowledge	More in-depth knowledge of ICT Organisations and Society is further articulated in specialised BoKs and standards.			
References	• Specific information policies • Theory of Information Revolution • Critical theory			

UNIT NAME	ICT INFRASTRUCTURE (15)
Unit description	The ICT Infrastructure knowledge unit concerns knowledge about the hardware, system software, databases and data files and deployed application software, technical procedures, and technical documentation used to make information available and the coordinated activities aimed at the management of an organization's ICT infrastructure across its complete life cycle including building, deploying, and decommissioning. Additionally, ICT infrastructure incorporates knowledge about operational activities such as day-to-day operations, maintenance, and continuous improvement.
Common Knowledge	All ICT professionals should understand the fundamentals of ICT Infrastructure as articulated in the unit description. Each ICT professional should understand the relevance and context of this subject to ICT in the organisation, including the following topics: • The basic principles and elements of ICT infrastructure • The key interrelationships of elements of an ICT infrastructure • Basic lifecycle of an ICT infrastructure (Plan-Build-Run-Manage-Enable) • Concept and history of the computer • Main computer components (e.g. processor, memory, buses, motherboard) • Types of computers (e.g. pc, minicomputer, mainframe, supercomputer) • Main input and output devices • Main characteristics of a computer, such as speed, storage capability

Tags for views	Knowledge Domain	EN16234-1 e-CF area(s)	EN16234-1 e-CF Competence(s)	ICT Professional Role Profile(s) CWA16458-1
	3. Architecture	A. PLAN B. BUILD C. RUN E. MANAGE	A.8. Sustainability Management B.6. ICT Systems Engineering C.3. Service Delivery C.5. Systems Management E.6. ICT Quality Management	Chief Information Officer Role (4) ICT Operations Manager Role (10) Service Manager Role (18)

Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Server management • Network management • Storage management • Security management • Database management • Application management • Virtual and remote assets
Specialised Knowledge	More in-depth knowledge of ICT infrastructure is further articulated in specialist standards and frameworks.
References	• ISO 20000: Standard for Service Management https://www.iso.org/standard/70636.html • ITIL

UNIT NAME	ICT IN ORGANSATIONS (16)			
Unit description	The knowledge unit ICT in organisations concerns knowledge about how ICT influences and enables different approaches to organisational structure, design, ways of working, and people managment and development.			
Common Knowledge	All ICT professionals should understand the fundamentals of ICT in organisations as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • ICT at the workplace • ICT in collaboration and communication, e.g. teams, globally distributed teams, social networking, interorganisational cooperation • Virtual working methods, cloud, e-business and virtual organisations • Potential positive and negative impacts of ICT on productivity and creativity			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area(s)** A. PLAN D. ENABLE E. MANAGE	**EN16234-1 e-CF Competence(s)** A.1. IS and Business Strategy Alignment D.9. Personnel Development E.7. Business Change Management	**ICT Professional Role Profile(s) CWA16458-1** Digital Transformation Leader Role (25) Chief Information Officer Role (4)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Impact of ICT on the organisation, its resources and personnel • Management of computer systems, staff management • Planning and analysis of ICT • Measurement and evaluation of the value of ICT • Organisational Capability models for ICT • Management of change			
Specialised Knowledge	More in-depth knowledge of ICT Organisations and Society is further articulated in specialised BoKs and standards.			
References	• The Information Technology Capability Maturity Framework (IT-CMF) - The Body of Knowledge Guide. (Innovation Value Institute – IVI) • Digital Practicioner Body of Knowledge™ Standard (The Open Group)			

UNIT NAME	ICT LEGAL ISSUES [T3] (17)			
Unit description	The ICT legal issues unit concerns legislation directly or indirectly relevant to either ICT infrastructure, ICT applications, data management or information management. ICT professionals must know and comply with national and international law as it applies to their activities when designing, building, maintaining, adapting, managing and operating computers and networks. Furthermore, they must know the legal restrictions applicable to their management or use of data and information. ICT Legal issues is a transversal aspect relevant to all ICT professional activities.			
Common Knowledge	This unit incorporates cross-cutting knowledge directly related to e-CF transversal aspect, 'T3 – ICT legal issues'. All ICT professionals should understand the fundamentals of ICT legal issues as articulated in the unit description. Each ICT professional should understand the relevance and context of this subject including the following topics: • Personal legal obligations • Basic understanding of areas of work covered by legal statutes • Use of data • Legislation relevant to health and safety			
Tags for views	**Knowledge Domain** 1. Transversal knowledge	**EN16234-1 e-CF area(s)** A.PLAN D.ENABLE E.MANAGE	**EN16234-1 e-CF Competence(s)** A.1. Information Systems and Business Strategy Alignment D.7. Date Science and Analytics D.10. Information and Knowledge Management E.9. Information Systems Governance	**ICT Professional Role Profile(s) CWA16458-1** Chief Information Officer Role (4) Information Security Manager Role (11) Digital Transformation Manager Role (25) Data Scientist Role (27)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the implications of ICT legal issues to the following key topics: • Computer Misuse • GDPR General Data Protection Regulation • Malicious communication • Investigatory Powers – traffic interception • Copyright • Intellectual Property Rights • Plagiarism			
Specialised Knowledge	More in-depth knowledge of ICT legal issues is further articulated in national and international law.			
References	• Legal compliance from JISC (Joint Information Systems Committee) https://www.jisc.ac.uk/guides/internet-safety/legal-compliance • Directive 2009/24/EC — the legal protection of computer programs • General Data Protection Regulation (GDPR)			

UNIT NAME	ICT PROJECT MANAGEMENT (18)			
Unit description	The ICT Project management knowledge unit contains knowledge related to the application of methods, tools, techniques and competences to a project which is defined as a temporary endeavour undertaken to create a unique product, service, or outcome. This unit includes knowledge of the various phases of the project life cycle and subsequent integration.			
Common Knowledge	All ICT professionals should understand the fundamentals of ICT Project management as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Principles of project-based work • General ICT project methods • Project life cycle and phases			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area(s)** E. MANAGE	**EN16234-1 e-CF Competence(s)** E.2. Project and Portfolio Management E.7. Business Change management	**ICT Professional Role Profile(s) CWA16458-1** Project Manager (15) DevOps Expert (26) Scrum Master (29)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Time, cost and quality of ICT projects • ICT Project organisation • ICT Project methods, tools and techniques • Project phases and results • Project planning, monitoring and control • Project evaluation • Project governance • Project risks and mitigation			
Specialised Knowledge	More in-depth knowledge of project management is further articulated in specialised BoKs, standards, frameworks, and methods.			
References	• ISO 21500 – Guidance on project management • ISO 21505 - Project, programme and portfolio management • IEEE 1058 - Standard for Software Project Management Plans • Project Management Body of Knowledge (PMBOK® - PMI) • PRINCE2®, IPMA, MSP®, AgilePM®, Scrum, DevOps			

UNIT NAME	ICT Quality (19)			
Unit description	The ICT Quality knowledge unit contains knowledge about the quality of ICT objects, such as products, services, processes, persons, organisation, systems, and resources. The quality of these objects depends on the degree to which the characteristics fulfil implied or obligatory needs or expectations. It also includes knowledge related to quality management, being the coordination of activities with regard to the quality of objects.			
Common Knowledge	All ICT professionals should understand the fundamentals of quality management as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Importance of quality • Quality in use and product quality • Widely used quality models			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area(s)** D. ENABLE E. MANAGE	**EN16234-1 e-CF Competence(s)** D.2. ICT Quality Strategy Development E.6. ICT Quality Management	**ICT Professional Role Profile(s) CWA16458-1** Project Manager (15) Quality Assurance Manager (16)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • ICT Quality policy, objectives and processes • Quality standards, models and methods • Quality planning and assurance • Quality control, metrics and analysis • Quality improvement • Cost of quality • Quality audits • Information and data quality • Software quality			
Specialised Knowledge	More in-depth knowledge of ICT quality is further articulated in specialised BoKs, standards, frameworks, and models.			
References	• ISO/IEC 25000 System and Software Quality Model (SQuaRE) • ISO 8000 Data Quality and Enterprise Master Data • ISO 9000 Quality Management, ISO 19011 Auditing • IEEE 730 Software quality assurance • Certified Software Quality Assurance (CSQA) Common Body of Knowledge (Quality Assurance Institute) • Certified Software Quality Engineer (CSQE) Body of Knowledge (ASQ) • Quality Body of Knowledge (QBOK)(ASQ) • Frameworks and models, such as: CMMI, Lean, Six Sigma, TQM, Deming			

UNIT NAME	ICT RISK MANAGEMENT (20)			
Unit description	The ICT risk management knowledge unit contains knowledge about the identification, assessment and management of the vulnerabilities to and potential impact of ICT risks to an organization. It includes knowledge of strategies, policies and methods to prevent, reduce and mitigate the negative impacts of ICT failure.			
Common Knowledge	All ICT professionals should understand the fundamentals of the ICT Risk Management Knowledge Unit as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Impact of ICT risks • Mitigating methods • Professional Individual Risk Mitigation Responsibilities			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area (s)** D.ENABLE E.MANAGE	**EN16234-1 e-CF Competence(s)** E.3. Risk Management D.1. Information Security Strategy Development E.8. Information Security Management	**ICT Professional Role Profile(s) CWA16458-1** Business Information Manager Role (3) Information Security Manager Role (11)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Governance of risk management • Business value of risk management • Profiling and Coverage • Risk tolerance assessment • Risk inventory or register • Economics (return on investment) of risk management • Processes for risk analysis and management • Risk management planning and monitoring • Mitigation and contingency actions • Principles, models, methods and techniques of risk management and risk analysis • Risk management education and communication methods			
Specialised Knowledge	More in-depth knowledge of ICT Risk Management is further articulated in specialised BoKs, and standards.			
References	• ISO 31000 Risk management			

UNIT NAME	ICT STRATEGY (21)			
Unit description	The ICT Strategy Knowledge Unit concerns knowledge about formulating a long-term vision and translating it into an actionable strategic plan for the IT function to deliver value to the organisation. It includes ways in which technology can enable and influence the organisational strategy and how ICT governance can monitor alignment.			
Common Knowledge	All ICT professionals should understand the fundamentals of the ICT Strategy Knowledge Unit as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Organisational vision • Impact of strategy on work activities			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area(s)** A. PLAN E. MANAGE	**EN16234-1 e-CF Competence(s)** A.1. IS and Business Strategy Alignment A.3. Business Plan Development E.7. Business Change Management	**ICT Professional Role Profile(s) CWA16458-1** Chief Information Officer (CIO) Role (4) Digital Transformation Leader Role (25)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Strategic options identification including challenges and opportunities in the IT function and other business units, • Plan development to implement the selected strategic options • Resourcing roles and responsibilities for ICT strategy • Stakeholder Management and Communication • Strategy processes aligning and integrating IT and business strategic plans and IT strategy's contribution to business objectives. • Formulate ICT Vision and Principles for IT value generation • Tracking and Evaluation of ICT strategy			
Specialised Knowledge	More in-depth knowledge of ICT strategy is further articulated in specialised BoKs and standards.			
References	• Awaiting expert guidance.			

UNIT NAME	INFORMATION ANALYSIS (22)			
Unit description	The information analysis knowledge unit contains knowledge about the development of systems and methods for the identification , analysis, interpretation and exploitation of information to improve organisational decision making and innovation capability. It includes methods of developing a culture which values and identifies information as central to organisational performance.			
Common Knowledge	All ICT professionals should understand the fundamentals of information analysis as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Role of information in work activities • Retrieving and communicating information			
Tags for views	Knowledge Domain 7. Business	EN16234-1 e-CF area(s) A. PLAN D. ENABLE	EN16234-1 e-CF Competence(s) A.6. Application Design D.11. Needs Identification D7. Data Science	ICT Professional Role Profile(s) CWA16458-1 Business Analyst Role (2)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Business needs • Organisation processes • Organisation structures • Need analyses techniques (e.g. observations, surveys, interviews, customer feedback) • Information management approaches			
Specialised Knowledge	More in-depth knowledge of Information Analysis is further articulated in specialised BoKs and standards.			
References	• ISO 13053 -1:2011: Quantitative methods in process improvement – Six Sigma – Part 1: DMAIC methodology • ISO 13053-2:2011 Quantitative methods in process improvement — Six Sigma — Part 2: Tools and techniques • BABOK			

UNIT NAME	INFORMATION PLANNING (23)			
Unit description	The information planning knowledge unit contains knowledge about the establishment of effective systems for gathering, organising and disseminating, information with the purpose of providing high quality information to the organization to support better decision-making.			
Common Knowledge	All ICT professionals should understand the fundamentals of information planning as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Role of information in work activities • Information Retrieval/Access			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area(s)** D.ENABLE	**EN16234-1 e-CF Competence(s)** A.1. IS and Business Strategy Alignment D.10. Information and Knowledge Management	**ICT Professional Role Profile(s) CWA16458-1** Business Analyst Role (2)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Information Management Strategy • Information Governance • Standards and Policies and monitoring techniques (controls) • Business Continuity Management			
Specialised Knowledge	More in-depth knowledge of information planning is further articulated in specialised BoKs and standards.			
References	• ISO 30301:2019. Information and documentation — Management systems for records — Requirements			

UNIT NAME	INFORMATION SYSTEMS DEVELOPMENT & IMPLEMENTATION (24)
Unit description	The Information systems development and implementation knowledge unit concerns knowledge relating to the activities that contribute to producing an information systems solution. It typically addresses an organizational problem or opportunity, such as specification, construction, testing and delivery of a new application or of a discrete addition to an existing application.
Common Knowledge	All ICT professionals should understand the fundamentals of information systems development and implementation as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Information systems development life cycle and phases • Main principles of system development approaches (e.g. lineair, incremental, iterative, spiral, agile) • General information systems development methods (e.g. waterfall, RAD, DSDM, Scrum, XP, DevOps) • Concept of process modelling and data modelling and basic techniques (e.g. DFD, ERD) • Difference between functional and non-functional requirements • Difference between functional and technical design

Tags for views	Knowledge Domain	EN16234-1 e-CF area(s)	EN16234-1 e-CF Competence(s)	ICT Professional Role Profile(s) CWA16458-1
	5. Software	B. BUILD	B.1. Application Development B.2. Component Integration B.6 Systems Engineering	Developer (6) Systems Architect (21)

Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Feasibility study • Requirements analysis • Process-oriented and data-oriented systems development • Basic principles of software tools and methods (e.g. CASE, IDE) • Prototyping • Verification and validation; metrics, testing • Methods and techniques for integration of components • Configuration, release and deployment • Distribution and backup
Specialised Knowledge	More in-depth knowledge of information systems development and implementation is further articulated in specialised BoKs and standards
References	• Software Engineering Body of Knowledge (SWEBOK – IEEE) • Systems Engineering Body of Knowledge (SEBOK – IEEE) • ISO/IEC/IEEE 24765 Systems and software engineering — Vocabulary • ISO/IEC/IEEE 12207 Systems and software engineering — Software life cycle processes • ISO/IEC/IEEE 15288 Systems and software engineering — System life cycle processes

UNIT NAME	KNOWLEDGE AND INFORMATION MANAGEMENT (25)			
Unit description	The Knowledge and Information Management Knowledge Unit concerns the identification, capture, organisation, analysis, sharing, and exploitation of knowledge and information to improve organisational performance. Its scope includes explicit knowledge and information i.e. representations that can be stored and analysed within knowledge or information systems but also the development and management of tacit knowledge and information, which is within people. An important part of knowledge and information management is developing the capacity to exploit and use knowledge to meet an organisation's strategic objectives through ensuring that KM and IM strategy enables organisational strategy.			
Common Knowledge	All ICT professionals should understand the fundamentals of the Knowledge and Information Management Knowledge Unit as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Information Management systems • Knowledge requirements to support work activities			
Tags for views	**Knowledge Domain** 6. Data	**EN16234-1 e-CF area(s)** D. ENABLE	**EN16234-1 e-CF Competence(s)** D.10. Information and Knowledge Management	**ICT Professional Role Profile(s) CWA16458-1** Business Information Manager Role (3) Data Specialist Role (28) Data Administrator Role (5)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Theories and models of KM and IM in organisations • Facilitation methods for knowledge sharing. (e.g. communities of practice), • Methods to encourage a knowledge based organisational culture • Methods of developing absorptive capacity i.e. ability to exploit knowledge effectively • Governance of knowledge and information management • Solutions for the identification, organisation and retrieval of information • Horizon scanning methods and techniques • Knowledge and information assessment and quality control • Knowledge Strategy			
Specialised Knowledge	More in-depth knowledge of Knowledge and Information Management is further articulated in specialised BoKs and standards.			
References	• ISO 30401:2018 Knowledge management systems • ISO 30301:2019 Information and documentation			

UNIT NAME	LEADERSHIP (26)			
Unit description	The Leadership knowledge unit concerns knowledge related to the guidance and direction of others towards a common goal. The unit includes supervision, motivation and work planning for individuals or teams. It encompasses knowledge about methods and techniques for coaching, conflict resolution, delegation and collaboration.			
Common Knowledge	All ICT professionals should understand the fundamentals of leadership as articulated in the unit description. Each ICT Professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • The organisations management structure • Personal development requirements • Participation in performance measurement systems			
Tags for views	**Knowledge Domain** 2.Behavioural knowledge	**EN16234-1 e-CF area(s)** E . MANAGE	**EN16234-1 e-CF Competence(s)** E.2. Project and Portfolio Management E.7. Business Change Management	**ICT Professional Role Profile(s) CWA16458-1** Chief Information Officer Role (4) ICT Operations Manager Role (10) Service Manager Role (18) Scrum Manager Role (29)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Leadership Styles • Performance Management • Personal Development Planning • Team Building			
Specialised Knowledge	More in-depth knowledge of Leadership is further articulated in specialised Boks and standards.			
References	• British Standards Institute (BSI) – ISO Standard Management System Standards https://www.bsigroup.com/LocalFiles/EN-HK/ISO%20Revision_FDIS/Importance%20of%20Leadership%20whitepaper%20-%20FINAL%20-%20July%202015.pdf • Chartered Management Institute Professional Standards for Management & Leadership https://www.managers.org.uk/individuals/become-a-member/professional-standards • Certified Leadership Professional CLP Body Of Knowledge (Canadian College For Leadership & Management 'CCLM')			

UNIT NAME	NETWORKS AND NETWORK SERVICES (27)			
Unit description	The Knowledge unit Networks and Network Services knowledge contains knowledge about the design, deployment and administration of networks including the assessment and judgement of which networks are suitable to share resources and communication using different network types like Wide Area Network, Local Area Network and Wireless LAN.			
Common Knowledge	All ICT professionals should understand the fundamentals of Networks and Network Services as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Topologies (Point to point, Ring, Star, mesh)			
Tags for views	**Knowledge Domain** 4. Networks	**EN16234-1 e-CF area (s)** B. BUILD C. RUN	**EN16234-1 e-CF Competence(s)** B.2. Component Integration B.4. Solution Deployment	**ICT Professional Role Profile(s) CWA16458-1** Network Specialist Role (14)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following topics: • Network types e.g. WAN, LAN, WLAN • Network usage e.g. Ethernet, IP, Satcom, ISO layer model • Network capacity e.g. 802.3x, DWDM • Network connections e.g. Optical fiber, UTP, WAP • Network components e.g. Switches, Routers, Gateways • Network security protocols e.g. 802.1X			
Specialised Knowledge	More in-depth knowledge of Networks and Network Services is further articulated in specialised BoKs and standards			
References	• IEEE 802.1Q • OSI Model • CompTIA Network+ • Supplier specific			

UNIT NAME	ORGANISATION PRINCIPLES (28)			
Unit description	The Organisation principles knowledge unit concerns knowledge related to organisations and their structures, in general. It is about the concept of organising and of the organisation of key elements such as structure, culture, strategy, coordinating mechanisms and coordination of activities. It also includes the aspect of organisational change.			
Common Knowledge	All ICT professionals should understand the fundamentals of organisation principles as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Typologies of organisation (e.g. Mintzberg) • Concept of organisational culture • Basic idea of management functions, actions and roles			
Tags for views	**Knowledge Domain(s)** 7. Business	**EN16234-1 e-CF area(s)** A. PLAN E. MANAGE	**EN16234-1 e-CF Competence(s)** A.1 IS and Business Strategy Alignment E.7 Business Change Management	**ICT Professional Role Profile(s) CWA16458-1** Chief Information Officer Role (4) Enterprise Architect Role (8) Digital Transformation Leader Role (25)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Principles and theories of organising • Forms of interorganisational collaboration (e.g. licensing agreement, technical cooperation, joint venture, subcontracting, etc.) • Culture models and values • Business strategy models and techniques • Supply chain • Organisational change			
Specialised Knowledge	More in-depth knowledge of organisation principles is further articulated in specialised BoKs, theory, frameworks, and models.			
References	• Strategic Planning and Strategic Management Body of Knowledge (ASP) https://www.strategyassociation.org/store/ViewProduct.aspx?id=4660938 • Configuration theory (Mintzberg) • Business Model Canvas • Theories of Taylor, Fayol, Weber, Human relations theory, Systems theory • Competing Values Framework • Iceberg model			

UNIT NAME	PRIVACY [T4] (29)			
Unit description	The Privacy knowledge unit contains knowledge about data privacy, also known as information privacy. It concerns decisions regarding data sharing with third parties. The importance of protecting data privacy is underlined by the introduction of the European General Data Protection Regulation (GDPR) law on data protection and privacy for all individuals. Privacy is a transversal aspect relevant to all ICT professional activities.			
Common Knowledge	This unit incorporates cross-cutting knowledge directly related to the e-CF transversal aspect, 'T4 – Privacy'. All ICT professionals should understand the fundamentals of privacy as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation and wider society, including the following topics: • An understanding of data protection as a fundamental right • The general principles and regulations of privacy and the reasons for ensuring privacy • General methods for generating and managing protected data			
Tags for views	**Knowledge Domain** 1. Transversal knowledge	**EN16234-1 e-CF area(s)** D. ENABLE E. MANAGE	**EN16234-1 e-CF Competence(s)** D.7. Data Science and Analytics D.10. Information and Knowledge Management E.9. IS Governance	**ICT Professional Role Profile(s) CWA16458-1** Business Information Manager Role (3) Chief Information Officer Role (4) Data Specialist Role (28)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • GDPR compliancy (e.g. relevant documents and reports) • Rights of the data subject • Conditions for collection and processing data • Principles for transfers of personal data • Role of independent supervisory authorities			
Specialised Knowledge	More in-depth knowledge of privacy is further articulated in specialised standards and regulation.			
References	• ISO/IEC 27701 Security techniques - Extension to ISO/IEC 27001 and ISO/IEC 27002 for privacy information management - Requirements and guidelines • European General Data Protection Regulation (GDPR)			

UNIT NAME	PROBLEM SOLVING (30)			
Unit description	The problem solving knowledge unit contains concerns knowledge related to methods of problem identification, interpretation and analysis for the purpose of drawing conclusions and making decisions. It includes inductive and deductive reasoning, evaluation and analysis.			
Common Knowledge	All ICT professionals need a basic understanding of Problem Solving as articulated in the unit description. Each ICT professional should understand the relevance and context of this subject to the organisation, including the following topics: • Problem identification • Problem description • Role of problem solving in work activities			
Tags for views	**Knowledge Domain** 2. Behavioural knowledge	**EN16234-1 e-CF area(s)** B. BUILD C. RUN	**EN16234-1 e-CF Competence(s)** C.4. Problem Management B.4. Solution Deployment	**ICT Professional Role Profile(s) CWA16458-1** Service Support Role (17) ICT Operations Manager Role (10)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Identification problem (e.g. root cause, trouble shooting) • Describing problem (e.g. alternatives, solution evaluation) • Quantify problem (e.g. Impact analysis)**)** • Inductive reasoning • Deductive reasoning • Systems thinking • Analytical methods • Solution evaluation • Investigative methods • Interpretation • Decision making based on best analysis • Critical situation escalation procedures • Troubleshooting processes and procedures			
Specialised Knowledge	More in-depth knowledge of Problem Solving is further articulated in specialised BoKs and standards.			
References	• Skills Match , 2019. SkillsMatch project is co-funded by European Commission Directorate General for Communications Networks,Content & Technology (DG CONNECT), Unit for Inclusion, Skills and Youth, under the grant agreement no. LC00822001 (OKT2017).			

UNIT NAME	PROGRAMMING LANGUAGES (31)			
Unit description	The Knowledge unit Programming Languages is knowledge about a formal language used to write computer programs performing an algorithm with instructions producing output or control devices.			
Common Knowledge	All ICT professionals should understand the fundamentals of Programming Languages as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Control structures • Data structures • Syntax • Variables			
Tags for views	**Knowledge Domain** 5. Software	**EN16234-1 e-CF area (s)** B. BUILD	**EN16234-1 e-CF Competence(s)** A.6. Application Design B.1. Application Development	**ICT Professional Role Profile(s) CWA16458-1** Developer Role (6)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following key topics: • Program language syntax and semantics • Libraries • Programming environment • Machine and assembly language to control computer CPU • Algorithm languages e.g. Algol 60, APL, COBOL, C, SQL • Compiling • Scripting • HTML, XML			
Specialised Knowledge	More in-depth knowledge of Programming Languages further articulated in specialised BoKs and standards.			
References	• ISO/IEC JTC 1/SC 22 • ISO references of programming languages			

UNIT NAME	PROGRAMMING PRINCIPLES (32)			
Unit description	The Knowledge unit Programming Principles contains knowledge about the process of coding, testing, troubleshooting, debugging and maintaining a system to write good code.			
Common Knowledge	All ICT professionals should understand the fundamentals of Programming Principles as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Abstraction • Methodology			
Tags for views	**Knowledge Domain** 5. Software	**EN16234-1 e-CF area (s)** B. BUILD	**EN16234-1 e-CF Competence(s)** A.6. Application Design B.1. Application Development	**ICT Professional Role Profile(s) CWA16458-1** Developer Role (6)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following key topics: • Programming paradigm e.g. Procedural, Functional, Structured, Object oriented • Procedural e.g. Iteration, Modularization • Functional e.g. Recursion • Structured e.g. Structograms, Indentation, Goto • Object oriented e.g. Class, Inheritance, Subtyping			
Specialised Knowledge	More in-depth knowledge of Programming Principles is further articulated in specialised BoKs and standards.			
References	• Awaiting expert input			

UNIT NAME	REQUIREMENTS ANALYSIS AND SPECIFICATIONS (33)			
Unit description	The Knowledge Requirements Analysis and Specifications Knowledge Unit contains knowledge about the capture of requirements, validation and the conversion of those requirements into effective requirements specifications for ICT systems.			
Common Knowledge	All ICT professionals should understand the fundamentals of Requirements Analysis and Specifications as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Stakeholder • Desk research • Facilitating			
Tags for views	**Knowledge Domain** 5. Software	**EN16234-1 e-CF area (s)** A. PLAN B. BUILD	**EN16234-1 e-CF Competence(s)** A.6. Application Design B.1. Application Development B.5. Document Production D.11. Needs Identification	**ICT Professional Role Profile(s) CWA16458-1** Business Analyst Role (2) Solution Designer Role (24) Product Owner Role (30)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following key topics: • Requirements e.g. modelling, validation, Usability • Needs analysis • Design Functional specifications e.g. Synthesis • Elicitation techniques for requirement capturing • User stories			
Specialised Knowledge	More in-depth knowledge of Requirements Analysis and Specifications is further articulated in specialised BoKs and standards.			
References	• BABOK • SWEBOK • SCRUM			

UNIT NAME	SECURITY [T5] (34)			
Unit description	The Security knowledge unit concerns knowledge related to the field of information security which is the practice of defending information from unauthorised access, use, disclosure, disruption, modification, perusal, inspection, recording or destruction. It also encompasses ICT security designed to prevent unauthorised access to computers, networks and data. The overarching goal of ICT security is to control access and maintain the confidentiality, integrity, and availability of sensitive information without inhibiting access by authorised users. Security is a transversal aspect relevant to all ICT professional activities.			
Common Knowledge	This unit incorporates cross-cutting knowledge directly related to the e-CF transversal aspect, 'T5 – Security'. All ICT professionals should understand the fundamentals of security as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Information security principles and standards • Common threats, attacks, vulnerabilities, and their consequences • Common measures and controls • Confidentiality, integrity and availability of information			
Tags for views	**Knowledge Domain** 1. Transversal knowledge	**EN16234-1 e-CF area(s)** D. ENABLE E. MANAGE	**EN16234-1 e-CF Competence(s)** D.1. Information Security Strategy Development E.8. Information Security Management	**ICT Professional Role Profile(s) CWA16458-1** Information Security Manager Role (11) Information Security Specialist Role (12)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Security policy and organisation • Best practices, standards, frameworks and principles of information security management • Information Security Management System • Security measures and controls • Identity and access management • Security operations and incident management • Security assessment and testing			
Specialised Knowledge	More in-depth knowledge of security is further articulated in specialised BoKs, standards, and frameworks.			
References	• ISO/IEC 27001, 27002 • Standard of good practice for Information Security (SOGP - ISF) • IEEE standards e.g. 802, 1363, 2600 https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/nis.pdf • NIST SP-800 series, NIST Cyber Security Framework • CISSP Common Body of Knowledge • CyBoK (CyBoK.org) • IT Security Essential BoK (US Dept. of Homeland Security) • Frameworks and models, such as: COBIT for Information Security, FAIR Framework, Critical Security Controls - CIS® Framework (SANS™ Institute)			

UNIT NAME	SERVICE DELIVERY AND SUPPORT (35)			
Unit description	The Knowledge unit Service Delivery and Support contains knowledge of ICT service management processes regulating ICT support, planning future needs , contracts and financial management to ensure most economical use of resources.			
Common Knowledge	All ICT professionals should understand the fundamentals of Service Delivery and Support as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Business support • Customer services • Resource planning			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area (s)** C. RUN	**EN16234-1 e-CF Competence(s)** A.2. Service Level Management C.1.User Support C.3. Service Delivery	**ICT Professional Role Profile(s) CWA16458-1** Service Support Role (17) Service Manager Role (18)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following topics: • Service levels • ICT Service Management Processes • Customer facing/user facing • Planning horizon • Service Level Agreements • Underpinning contracts • Financial Management • Quality Performance			
Specialised Knowledge	More in-depth knowledge of Service Delivery and Support is further articulated in specialised BoKs and standards.			
References	• ISO 20000			

UNIT NAME	SOFTWARE DESIGN (36)			
Unit description	The Knowledge unit Software Design contains knowledge about setting up a plan for a software application satisfying functional and non-functional requirements. It includes knowledge about evaluation of the trade-offs that need to be made like performance and resource consumption so that the application is optimised to the requirements.			
Common Knowledge	All ICT professionals should understand the fundamentals of Software Design as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Software design as activity in the software life cycle • Software requirements, functional and non-functional • General notion of structured design, object-oriented design and component-based design			
Tags for views	**Knowledge Domain(s)** 5. Software	**EN16234-1 e-CF area (s)** A. PLAN B. BUILD	**EN16234-1 e-CF Competence(s)** A.6. Application Design B.1. Application Development	**ICT Professional Role Profile(s) CWA16458-1** Developer Role (6) Digital Media Specialist Role (7)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following topics: • Software design methodologies and frameworks • Software modules of suppliers • Difference between software architecture design and software detailed design • Data design, architecture design, interface design, procedural design • Software structure and architecture; components and interfaces • Software models • Software design principles, e.g. abstraction, coupling, encapsulation • User interface design • Software design tools • Software design quality analysis and evaluation • Metrics like performance calculations and resource consumption			
Specialised Knowledge	More in-depth knowledge of Software Design is further articulated in specialised BoKs and standards.			
References	• SWEBOK • IEEE 1016 Standard for Information Technology—Systems Design—Software Design Descriptions			

UNIT NAME	SOURCING (37)			
Unit description	The Sourcing Knowledge Unit contains knowledge about how to manage the provision of ICT services and products. It includes knowledge on how to select, integrate, and manage ICT suppliers in line with sourcing and supplier management strategies to deliver organisational value, minimise risk, enable innovation and develop effective relationships.			
Common Knowledge	All ICT professionals should understand the fundamentals of the Sourcing Knowledge Unit as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Role of ICT suppliers to organisation • Relationship management with suppliers			
Tags for views	**Knowledge Domain** 7. Business	**EN16234-1 e-CF area(s)** A.PLAN D.ENABLE E.MANAGE	**EN16234-1 e-CF Competence(s)** A.2. Service Level Management A.3. Business Plan Development D.4. Purchasing D.8. Contract Management E.4. Relationship Management	**ICT Professional Role Profile(s) CWA16458-1** Account Manager Role (1) Chief Information Officer Role (4) Business Information Manager Role (3)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Sourcing Strategy -Alignment, Objectives and Scoping, • Strategy Sourcing Models • Supplier Contracting and Classification • Supplier Identification and Selection, • Contract Preparation and Closing • Supplier Integration and Engagement • Supplier Relationships, • Supplier Communication and Governance, • Supplier Operations Management • Performance Management and Contract Compliance, • Continuity of Supply, • Supplier Innovation Management			
Specialised Knowledge	More in-depth knowledge of Sourcing is further articulated in specialised BoKs and standards.			
References	*Awaiting expert input*			

UNIT NAME	SUSTAINABILITY [T6] (38)			
Unit description	The sustainability knowledge unit contains knowledge about minimising the environmental impact of ICT and also achieving broader sustainability goals influenced by ICT. Sustainability represents meeting organisational needs without compromising the future. Note the social justice aspects of sustainability are further covered in the KU ICT AND SOCIETY (13).			
Common Knowledge	The Sustainability Knowledge Unit incorporates cross-cutting knowledge directly related to the e-CF transversal aspect, 'T6 Sustainability'. All ICT professionals should understand the fundamentals of Sustainability as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation and wider society, including the following topics: • Environmental impact of ICT • Methods to mitigate impact			
Tags for views	**Knowledge Domain** 1.Transversal knowledge	**EN16234-1 e-CF area(s)** A.PLAN	**EN16234-1 e-CF Competence(s)** A.7. Technology Trend Monitoring A.8. Sustainable Development	**ICT Professional Role Profile(s) CWA16458-1** Chief Information Officer Role (4) ICT Operations Manager Role (10) Business Analyst Role (2)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • ICT life cycles and their environmental impact • Sustainability strategy and alignment to business • sustainability goals definition and tracking • People and culture issues to encourage adoption of sustainable ICT • sustainable ICT metrics and indicators • corporate social responsibility (CSR) of stakeholders • green ICT and environmental standards • social and financial sustainability analysis methods • power consumption models of software and/or hardware			
Specialised Knowledge	More in-depth knowledge of Sustainability is further articulated in specialised BoKs and standards.			
References	• ISO 14001 2015 - Environmental Management Systems - Requirements with guidance for use • ISO/IEC 14001:2015 specifies the requirements for an environmental management system (EMS) – a framework for an organisation to control the environmental impacts of its activities, products and services, and continually improve its environmental performance. It supersedes ISO 14001:2004.			

UNIT NAME	SYSTEM ADMINISTRATION (39)			
Unit description	The system administration knowledge unit contains knowledge about the management, upkeep, and configuration of business computer systems with the purpose of providing a reliable, secure and efficient work environment. This includes monitoring systems for efficiency and security, coordination of access control methods and the development of recommendations for ICT policy and process improvements.			
Common Knowledge	All ICT professionals should understand the fundamentals of the system administration knowledge unit as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Security features of system • Role of system in supporting work activities			
Tags for views	**Knowledge Domain** 5. Software	**EN16234-1 e-CF area(s)** B.BUILD C.RUN	**EN16234-1 e-CF Competence(s)** B.2. Component Integration C.5. Systems Management	**ICT Professional Role Profile(s) CWA16458-1** Systems Administrator Role (19)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • identity authentication and management • storage management and database administration • systems and services provision, monitoring, scripting and logging • capacity management and load balancing • deployment techniques for networks and systems e.g. systems configuration • principles of systems and data security • database management systems • the ICT infrastructure and the business organisation • testing methods and tools			
Specialised Knowledge	More in-depth knowledge of System Administration is further articulated in specialised BoKs and standards.			
References	• http://sabok.org/?-			

UNIT NAME	SYSTEM SOFTWARE (40)			
Unit description	The Knowledge Unit System Software contains knowledge about software that manages and supports the operation and maintenance of the computer system and associated programs. It acts as intermediary between the user and the computer and between the application software and the computer system hardware.			
Common Knowledge	All ICT professionals should understand the fundamentals of system software as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Concept of software as a series of instructions • System software as one the major categories of software, besides application software • Role of system software • Categories of systems software and their different functions (operating systems, utility programs, development programs) • Examples of most widely used operating systems			
Tags for views	**Knowledge Domain** 5. Software	**EN16234-1 e-CF area (s)** A. PLAN B. BUILD	**EN16234-1 e-CF Competence(s)** A.5. Architecture Design B.2. Component Integration B.6. Systems Engineering	**ICT Professional Role Profile(s) CWA16458-1** Developer Role (6) Systems Analyst Role (20) Systems Architect Role (21)
Base Knowledge	ICT professionals specialised in this field should have advanced knowledge in the following key topics: • Categories of operating systems, e.g. personal operating systems, mainframe operating systems, server operating systems, network operating systems, multiprocessor operating systems, mobile operating systems, embedded operating systems • Common features, principles and architecture e.g. BIOS, booting, interrupts, memory management, file systems, device drivers, networking, security, I/O • Processing techniques for increased efficiency, e.g. multitasking, multithreading, multiprocessing • Principles of computer programming tools, e.g. compilers and linker			
Specialised Knowledge	More in-depth knowledge of Operating Systems is further articulated in specialised BoKs and standards.			
References	• Supplier specific			

UNIT NAME	TESTING (41)			
Unit description	The testing knowledge unit contains knowledge about the systematic validation and verification of specific properties of test items, such as the functionality, reliability, usability or compliance of items, such as hardware, software or systems components to meet the predetermined criteria. This encompasses knowledge of all the testing related activities, including the planning, preparation, execution, reporting, and management of testing.			
Common Knowledge	All ICT professionals should understand the fundamentals of testing as articulated in the unit description. Each ICT professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • The need for testing following technical intervention • Basic principles of testing • Verification of functionality			
Tags for views	**Knowledge Domain** 5. Software	**EN16234-1 e-CF area(s)** B. BUILD	**EN16234-1 e-CF Competence(s)** B.1. Application Development B.2. Component Integration B.3. Testing	**ICT Professional Role Profile(s) CWA16458-1** Developer (6) Information Security Specialist (12) Test Specialist (23) Devops Expert (26)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Testing cycle and process • Test methods (e.g. black-box, white-box testing, static, dynamic) • Test levels (e.g. unit, integration, system, acceptance testing) • Test types (e.g. functional and non-functional testing) • Test techniques and tools			
Specialised Knowledge	More in-depth knowledge of testing is further articulated in specialised BoKs, and standards.			
References	• ISO/IEC/IEEE 29119 Software Testing https://softwaretestingstandard.org https://www.iso.org/standard/45142.html • Software Testing Body Of knowledge (CSTE) (International Software Certifications Board (ISCB) https://www.softwarecertifications.org/software-testing-body-of-knowledge-cste/ • Software Test Automation Body of Knowledge (STABOK) (International Institute for Software Testing (IIST)) https://testinginstitute.com/stabok.php • ISTQB® Test Body of Knowledge (TBOK) (International Software Testing Qualifications Board (ISTQB®)) https://www.istqb.org/ • Test Management Approach - TMap® (Sogeti) https://www.tmap.net/			

UNIT NAME	USABILITY [T7] (42)			
Unit description	The usability knowledge unit contains knowledge of the process for determining the needs of users at all stages of the life cycle for IT service and solution provision. The topic addresses the design and development of optimised functional human interfaces, in terms of learnability, operability and accessibility. Usability is a transversal aspect relevant to all ICT professional activities.			
Common Knowledge	This unit incorporates cross-cutting knowledge directly related to the e-CF transversal aspect, 'T7 - Usability'. All ICT professionals should understand the fundamentals of usability as articulated in the unit description. Each ICT professional should understand the relevance and context of this subject to ICT, including the following topics: • Recognition of usability issues • Relevance of usability in different environments • Understanding user experiences			
Tags for views	**Knowledge Domain** 1. Transversal knowledge	**EN16234-1 e-CF area(s)** A.PLAN B. BUILD	**EN16234-1 e-CF Competence(s)** A.6. Application Design A.10. User Experience B.1. Application Development	**ICT Professional Role Profile(s) CWA16458-1** Developer Role (6) Digital Media Specialist Role (7) Solution Designer Role (24)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Principles of usability, (e.g. ergonomics, interoperability, Human-System Interaction, Human-Centred Design) • User research • Requirements methods • Task analysis • Design methods • Usability evaluation methods			
Specialised Knowledge	More in-depth knowledge of usability is further articulated in specialised BoKs and standards.			
References	• International Standard ISO 9241 Ergonomics of human-system interaction **https://www.iso.org/obp/ui/#iso:std:iso:9241:-11:ed-2:v1:en** • Usability Body of Knowledge (The User Experience Professionals' Association (UXPA)) https://www.usabilitybok.org/			

UNIT NAME	USER INTERFACE AND WEB DESIGN (43)			
Unit description	The User interface and web design knowledge unit concerns the design of software and hardware components that interact with the user and provide information and control to that user, such as the visuals and usability of websites or interactive applications hosted on computers, tablets and smart phones. This topic encompasses web development, user controls (buttons, gestures and voice) and user experience including, user feelings and behaviour.			
Common Knowledge	All ICT professionals should understand the fundamentals of user interface and web design as articulated in the unit description. Each ICT Professional should be aware of the relevance and context of this subject to ICT in the organisation, including the following topics: • Basic principles of user interfaces • Types of common user input devices • Effectiveness and quality of interfaces			
Tags for views	**Knowledge Domain** 5. Software	**EN16234-1 e-CF area(s)** A.PLAN B. BUILD D.ENABLE	**EN16234-1 e-CF Competence(s)** A.6. Application Design A.10. User Experience B.1. Application Development D.7. Data Science and Analytics	**ICT Professional Role Profile(s) CWA16458-1** Developer Role (6) Digital Media Specialist Role (7) Solution Designer Role (24) Data Specialist Role (27)
Base Knowledge	ICT professionals specialising in this field should have knowledge that includes the following topics: • Principles of user-centred design and usability • Methods and techniques of user research • Interaction design principles (e.g. Nielsen's heuristics) • Visual design principles (e.g. structure, simplicity, visibility, feedback, tolerance, reuse)			
Specialised Knowledge	More in-depth knowledge of User interface and web design is further articulated in specialised BoKs and standards.			
References	• ISO 9241 Ergonomics of human-system interaction https://www.iso.org/standard/60476.html • ISO/IEC/IEEE 23026 Engineering and management of websites https://standards.ieee.org/standard/23026-2015.html • Web Management Professional Body of Knowledge (WMPBoK)(Web Management Institute) http://webmanagementinstitute.org/wmbok/ • Usability Body of Knowledge (The User Experience Professionals' Association (UXPA)) https://www.usabilitybok.org/			