

# The CIPS Guide to the Common Body of Knowledge for Computing and IT (CBOK)

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Following the adoption of the CIPS Initial Body of Knowledge in 2005, CIPS has now embarked on a new project to define a more comprehensive document. This will be used as a basis for activities such as certification and accreditation. The CBOK will contain a list of topics about which any Computing Professional or Information Technology Professional should have some knowledge. The range of such professionals includes programmers, business analysts, computer scientists, software engineers, data centre managers and many others.

The Draft CBOK is currently under review. To contribute to the review process, please go to [the survey site](#). Thanks.

## Topics in the Body of Knowledge

### A Professionalism and Ethics in Computing and IT

**A1 History:** History of computing and IT; computing prehistory; history of hardware, software, and networking; pioneers of computing. [[R0001](#) , [R0002](#) , [R0003](#) ]

**A2 The profession:** Governing bodies and societies at the provincial, national and international level (CIPS, IFIP, others) [[R0150](#) , [R0151](#) , [R0152](#) , [R0153](#) , [R0154](#) , [R0155](#) , [R0156](#) ]

**A3 Social responsibility and impact on society:** Responsibility to protect the public; corporate social responsibility; personal pro-bono donation of expertise; disastrous failures such as the Therac-25; personal impact such as the replacement of people through automation; community, national and international impact. [[R0200](#) , [R0201](#) , [R0202](#) , [R0203](#) , [R0204](#) , [R0205](#) ]

**A4 Impact on the environment:** Green computing, waste disposal [[R0250](#) , [R0251](#) ]

**A5 Codes of ethics:** Codes of ethics of CIPS and other societies; discipline procedures for breach of codes; acceptable use policies; resolving ethical dilemmas [[R0300](#) , [R0301](#) , [R0302](#) , [R0303](#) , [R0304](#) ]

**A6 The labour market:** Current and projected supply and demand; occupational characteristics; education and training requirements; classification systems and crosswalks; labor in a mature profession (fair and open competition; independence in thought and outlook) [[R0350](#) , [R0351](#) ]

**A7 Standards for skills and education:** Accreditation (the Seoul Accord and its graduate attributes); bodies of knowledge such as CIPS CBOK and SWEBOK; skills frameworks such as SFIA [[R0400](#) , [R0401](#) , [R0402](#) , [R0403](#) , [R0404](#) , [R0405](#) , [R0406](#) , [R0407](#) , [R0408](#) , [R0409](#) , [R0410](#) ]

**A8 Professional recognition:** Certifications such as ISP and ITCP [[R0450](#) , [R0451](#) , [R0452](#) , [R0453](#) , [R0454](#) ]

### B Law and Regulations Relevant to Computing and IT

**B1 Tort and liability:** Basic definitions and principles of tort and liability; duty of care; standards of care [[R1000](#) ]

**B2 Contracts:** Requirements of a valid contract; breach of contract; fixed-price vs. time-and-materials contracts; service-level and operational-level agreements; license agreements, including those for open source; outsourcing agreements; source code escrow agreements; cloud computing contracts [[R1050](#) , [R1000](#) ]

**B3 Privacy and access-to-information law:** The Privacy Act, PIPEDA; UN and OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data [[R1100](#) , [R1101](#) , [R1102](#) ]

**B4 Intellectual property law:** Patents, copyright, trade secrets, trade marks [[R1150](#) ]

**B5 Accountability:** Sarbanes Oxley and similar laws

**B6 Whistle blowing and ethical dissent:** Legal protections for whistle blowers [[R1300](#) ]

**B7 Law regarding access for the disabled:** Provincial disabilities acts [[R1350](#) ]

**B8 Computer Crime:** Computer-based fraud, cyber bullying, cyberterrorism, piracy, hacking, virus dissemination, spam, phishing ,spoofing, cyber defamation, denial of service attacks, cyber-stalking, obscene or offense content. [[R1400](#) , [R1401](#) , [R1402](#) ]

**B9 Workplace health and safety:** Freedom from harassment, repetitive stress injury [[R1450](#) , [R1451](#) , [R1452](#) ]

## C Mathematics Foundations for Computing and IT

**C1 Boolean logic:** Boolean operators, truth tables, Venn diagrams, inference rules [[R2000](#) , [R2001](#) ]

**C2 Probability and statistics:** Rules of probability; analysis of simple data such as experiment results [[R2100](#) ]

**C3 Predicate logic:** Quantifiers, first order logic [[R2000](#) , [R2001](#) ]

**C4 Discrete mathematics:** [[R2200](#) ]

**C5 Numerical computation and analysis:** Numerical errors; computational algorithms

**C6 Differential and Integral Calculus:**

## D Technical Knowledge for Computing and IT

**D1 Concept of a system:** Notion of a system in general; systems thinking [[R3000](#) ]

**D2 Use of computers and IT systems:** Use of command line-based tools and graphical interfaces to control computers with different form factors and operating systems (mainframe, micro, mobile device, etc.); use of spreadsheets and word processors [[R3100](#) ]

**D3 Software elements of a computer system:** Operating system, device drivers; maintenance, upgrading and patching of installed operating system and applications [[R3200](#) , [R3201](#) ]

**D4 Hardware elements of a computer system:** Processors, memory, busses, cache, I/O devices, internal and external storage, power supplies; computer troubleshooting, repair, installation and preventative maintenance. [[R3300](#) ]

**D5 Programming basics:** Control constructs (loops, selection) and conditions; functions/methods and recursion; structured programming; objects and classes; use of APIs, libraries and components; concurrency and parallelism [[R3400](#) , [R3401](#) , [R3402](#) ]

**D6 Programming language types:** Procedural vs. logic vs. functional languages; level of abstraction (microcode, assembler, compiler, interpreter, etc.); statically vs. dynamically typed languages [[R3500](#) , [R3501](#) ]

**D7 Data structures:** Arrays, linked lists, hash tables and trees [[R3600](#) ]

**D8 Algorithms:** Searching (binary search); selecting an efficient sort algorithm; basic notions of space and time complexity and of computability [[R3700](#) ]

**D9 Information and data modeling:** Modeling data and information; use of notations including UML class diagrams and Entity-Relationship Diagrams [[R4000](#) , [R4001](#) , [R4002](#) , [R4050](#) , [R4051](#) , [R8350](#) ]

**D10 Databases:** Tables, columns, keys, querying using SQL; normalization; relational and alternative models [[R4100](#) , [R4101](#) , [R4102](#) , [R4103](#) , [R4104](#) , [R4105](#) ]

**D11 Business process and activity modeling:** Modeling activities and business processes, including BPEL, BPMN and UML activity diagrams [[R4200](#) , [R4050](#) , [R4051](#) , [R8350](#) ]

**D12 Software architecture and modeling:** Architectural patterns including client-server, layering, web architecture, pipe-and-filter, input-process-output; use of notations including UML for software architecture [[R4300](#) , [R4301](#) , [R4050](#) , [R4051](#) , [R8350](#) ]

**D13 Enterprise architecture and modeling:** The information technology services, processes and infrastructure of an enterprise [[R4400](#) , [R4401](#) ]

**D14 Networking:** Network architecture; OSI model and layers, including TCP-IP; addressing and subnetting; switching and routing [[R4500](#) , [R4501](#) ]

**D15 Organization of a data centre:** Layout; capacity; support infrastructure (power system, cabling, HVAC); managing system configurations [[R4600](#) , [R4601](#) ]

**D16 Web concepts:** Web pages and websites; tables and forms; rich Internet applications (AJAX); XML schemas and documents [[R4700](#) , [R4701](#) ]

**D17 Real time systems concepts:** Hard real time, soft real time [[R4800](#) ]

**D18 Parsing and grammars:** Writing grammars, use of parsing tools and libraries [[R4850](#) , [R4851](#) ]

## E Quality Issues for Computing and IT

**E1 Quality models:** Quality systems (people, process, technology control, assurance verification, validation, acceptance, assessment, appraisal, audit); ISO (9001, 12207); CMM (CoBit, CMMI) [[R5000](#) ]

**E2 External quality:** Efficiency, reliability, availability [[R5100](#) ]

**E3 Human factors quality:** User interface design; usability, consumability, ergonomics; evaluation methods [[R5200](#) , [R5201](#) , [R5202](#) ]

**E4 Internal quality:** Maintainability, reusability, migratability, operability, scalability [[R5100](#) ]

**E5 Security and privacy:** Logical and physical security; risks, threats, attack methods, breaches, vulnerabilities, safeguards, remediation; security domains (operating systems, network, data); social engineering; secure coding; basic cryptography; confidentiality, integrity and availability (identification, authentication, authorization, accounting and auditing business continuity and disaster recovery planning [[R5400](#) , [R5401](#) , [R5402](#) ]

**E6 Safety and critical systems:** Hazards, accidents and incidents; public safety (emergency and disaster scenarios); safety-instrumented systems; mission-critical systems [[R5500](#) , [R5501](#) ]

## F Process Knowledge for Computing and IT

**F1 Stakeholders:** Clients, users, management [[R8000](#) , [R8001](#) , [R8002](#) , [R8350](#) ]

**F2 System development lifecycle:** Stages including requirements, design, implementation, deployment, retirement [[R8100](#) , [R8101](#) , [R8102](#) , [R8103](#) , [R8104](#) , [R8350](#) ]

**F3 Categories of development methods:** Agile, iterative, prototyping [[R8150](#) , [R8103](#) , [R8104](#) ]

**F4 Types of requirements:** Quality, platform, functional [[R8250](#) , [R8251](#) , [R8103](#) , [R8104](#) , [R8350](#) ]

**F5 Gathering and validating requirements:** Interviewing, brainstorming; completeness, unambiguity, etc. [[R8300](#) , [R8350](#) ]

**F6 Design principles:** Divide and conquer, reduce coupling, encapsulation; design patterns [[R8350](#) , [R8351](#) , [R8352](#) , [R8103](#) , [R8104](#) ]

**F7 Testing principles:** Unit vs. system; black vs. white box; coverage; test cases; test plans; test-driven development [[R8380](#) , [R8381](#) ]

**F8 Inspection principles :** Examining or measuring to verify whether an activity, component, result, product, service or process conforms to specified requirements. [[R8350](#) , [R8400](#) , [R8401](#) ]

**F9 Decision-making methods:** Intervention, financial; cost-benefit analysis; return on investment [[R8390](#) , [R8391](#) ]

**F10 Process visualization techniques:** Pert charts, Gantt charts [[R8402](#) ]

**F11 Change, version and configuration management:** Identification of configuration items; tools for version control and configuration management [[R8420](#) ]

**F12 Risk management:** Types of risks, including obsolescence, lifecycle risks; risk identification; risk assessment; risk mitigation; risk re-evaluation [[R8430](#) ]

**F13 Information management:** Functional classification; record keeping; document management; retention and disposition authorities; e-discovery; access to information demands [[R8450](#) , [R8451](#) , [R8452](#) , [R8453](#) ]

**F14 Standards:** Standards bodies; categorization of standards; SE, Networking, It etc. / IEEE, ISO, ITU; process and quality standards (ISO 12207, 9000, 2910; CMM) [[R8480](#) , [R8481](#) ]

**F15 Continuous improvement:** [[R8500](#) , [R8501](#) ]

## **G Business Knowledge for Computing and IT**

**G1 Organization of a business involving IT or computing:** Computing and IT businesses; IT within the business [[R9100](#) ]

**G2 Value analysis:** Time value of money; discounted cash flow [[R9200](#) ]

**G3 Business software application types:** ERP, Financial, HR, performance management, analytics, business intelligent

**G4 Business continuity, disaster recovery:** [[R9400](#) , [R9401](#) ]

**G5 International business:**

**G6 Electronic commerce:**

**G7 Service management:** Help desk; service desk; service-level agreements; workflow review and approvals [[R9700](#) , [R9701](#) , [R9702](#) , [R9703](#) ]

**G8 Security management:** Policies, procedures and standards [[R9800](#) ]

**G9 System acquisition:** Consider Business Cases, statements of work, procurement vehicles-MERX, solicitations, direct, assessment and award processes [[R9850](#) , [R9851](#) , [R9852](#) , [R9853](#) , [R9854](#) ]

## H Soft skills

**H1 Problem solving:** Reasoning methods, research methods, general analysis methods

**H2 Written communication:** Reports, business cases, strategies, plans, briefing notes, memos, email [[R9910](#) ]

**H3 Oral communication:** Presentations, speeches, training, demonstrations [[R9930](#) , [R9931](#) , [R9932](#) , [R9933](#) , [R9934](#) , [R9935](#) ]

**H4 Negotiating skills:** Listening, bargaining, win-win [[R9940](#) , [R9941](#) , [R9942](#) , [R9943](#) , [R9944](#) ]

**H5 Workplace culture:** Shared belief system of values and processes within an organization; dealing with supervisors and clients; mentoring; professional development; succession planning; personality types [[R9950](#) , [R9951](#) , [R9952](#) , [R9953](#) , [R9954](#) ]

**H6 Change management:** Leading people through transitions respecting their different stages of accepting change. [[R9960](#) , [R9961](#) , [R9962](#) ]

**H7 Leadership:** Leading by example, and not having to be the senior executive/role. Leadership based on the principle of being earned by those that choose to follow. [[R9970](#) , [R9971](#) , [R9972](#) , [R9973](#) , [R9974](#) ]

**H8 Teamwork:** Cooperating with others

**H9 Strategic planning:** Theory and application of strategic planning and outcomes-based performance reporting. [[R9980](#) , [R9981](#) , [R9982](#) ]

**H10 Portfolio management:** Priority Setting; investment planning; risk management; asset lifecycle; management of licenses, hardware, and applications [[R9990](#) ]

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