Knowledge Area Structure

2015 March 31
Version 0.21

Essential IT Component

(290 Essential Hours)

Proposed Information Technology[1]	*Knowledge Areas and Units*[2]
ITE-PRO[3] **Programming** [30 hours[4]] ITE-PRO-01[5] History and overview [1] ITE-PRO-02 Fundamental programming constructs [5] ITE-PRO-03 Object-oriented programming [5] ITE-PRO-04 Fundamental data structures [4] ITE-PRO-05 Application domains [3] ITE-PRO-06 Basics of designing computer programs [3] ITE-PRO-07 Event-driven programming [3] ITE-PRO-08 Introduction to algorithms [3] ITE-PRO-09 Problem-solving and critical thinking [3]	**ITE-IMA Information Management** [40 hours] ITE-IMA-01 History and overview [1] ITE-IMA-02 Concepts and fundamentals [8] ITE-IMA-03 Database query languages [9] ITE-IMA-04 Data organization architecture [8] ITE-IMA-05 Data modeling [7] ITE-IMA-06 Managing the database environment [5] ITE-IMA-07 Special-purpose databases [2]
ITE-HCI Human Computer Interaction [20 hours] ITE-HCI-01 History and overview [1] ITE-HCI-02 Human factors [5] ITE-HCI-03 Developing effective interfaces [3] ITE-HCI-04 HCI aspects of application domains [3] ITE-HCI-05 Human-centered evaluation [3] ITE-HCI-06 Accessibility [2] ITE-HCI-07 Emerging technologies [2] ITE-HCI-08 Human-centered computing [1]	**ITE-NET Networking** [40 hours] ITE-NET-01 History and overview [1] ITE-NET-02 Foundations of networking [3] ITE-NET-03 Routing and switching [8] ITE-NET-04 Networking and interconnectivity [7] ITE-NET-05 Physical layer [6] ITE-NET-06 Application areas [5] ITE-NET-07 Network management [5] ITE-NET-08 Network Security [5]
ITE-SIA System Integration and Architecture [20 hours] ITE-SIA-01 History and overview [1] ITE-SIA-02 Acquisition and sourcing [4] ITE-SIA-03 Requirements [4] ITE-SIA-04 Integration and deployment [3] ITE-SIA-05 Project management [3] ITE-SIA-06 Testing and quality assurance [3] ITE-SIA-07 Architecture [1] ITE-SIA-08 Organizational context [1]	**ITE-WST Web Systems and Technologies** [30 hours] ITE-WST-01 History and overview [1] ITE-WST-02 Web technologies [6] ITE-WST-03 Digital media [5] ITE-WST-04 Mobile applications concepts [5] ITE-WST-05 Information architecture [4] ITE-WST-06 Web development [4] ITE-WST-07 Vulnerabilities [3] ITE-WST-08 Social software [2]
ITE-PTE Platform Technologies [20 hours] ITE-PTE-01 History and overview [1] ITE-PTE-02 Operating systems [10] ITE-PTE-03 Architecture and organization [4] ITE-PTE-04 Software design concepts [3] ITE-PTE-05 Computing infrastructures [2]	**ITE-SAD System Administration** [20 hours] ITE-SAD-01 History and overview [1] ITE-SAD-02 Operating systems [5] ITE-SAD-03 Administrative activities [5] ITE-SAD-04 Administrative domains [5] ITE-SAD-05 Applications [4]

Proposed – IT2017 Information Technology – Body of Knowledge

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Proposed Information Technology[1]	*Knowledge Areas and Units*[2]
ITE-CSE Cybersecurity Essentials [40 hours]	**ITE-SPI Social and Professional Issues** [30 hours]
ITE-CSE-01 History and overview [1]	ITE-SPI-01 History and overview [1]
ITE-CSE-02 Security services [5]	ITE-SPI-02 Employability skills and careers in IT [3]
ITE-CSE-03 Cyber-attacks and detection [4]	ITE-SPI-03 Intellectual property [3]
ITE-CSE-04 Operational issues [4]	ITE-SPI-04 IT and its related and informing disciplines [3]
ITE-CSE-05 Security mechanisms and countermeasures [4]	ITE-SPI-05 IT governance [3]
ITE-CSE-06 Vulnerabilities, threats and risk [4]	ITE-SPI-06 Professional communications [3]
ITE-CSE-07 Anonymity systems [3]	ITE-SPI-07 Social context of computing [3]
ITE-CSE-08 Usable security [3]	ITE-SPI-08 Teamwork concepts and issues [3]
ITE-CSE-09 Cryptography overview [2]	ITE-SPI-09 Legal issues in computing [2]
ITE-CSE-10 Malware fundamentals [2]	ITE-SPI-10 Organizational context [2]
ITE-CSE-11 Mitigation and Recovery [2]	ITE-SPI-11 Privacy and civil liberties [2]
ITE-CSE-12 Personally identifiable information [2]	ITE-SPI-12 Professional issues and responsibilities [2]
ITE-CSE-13 Policy Issues [2]	
ITE-CSE-14 Reporting requirements [2]	

IT Applied Domains Component

(130 Hours selected from 260 possible hours)

Proposed Information Technology Knowledge Areas and Units	
ITA-SDE Software Design [20 hours] ITA-SDE-01 Basics of files and databases [4] ITA-SDE-02 Graphical user interface programming [4] ITA-SDE-03 Object-oriented programming design [4] ITA-SDE-04 Program development with logic tools [4] ITA-SDE-05 Web programming [4]	**ITA-GCO Green Computing** [10 hours] ITA-GCO-01 History and overview [1] ITA-GCO-02 Government role and regulations [3] ITA-GCO-03 The role of electric utilities [3] ITA-GCO-04 Energy standards [2] ITA-GCO-05 Global case studies and approaches [1]
ITE-IOT Internet of Things [30 hours] ITE-IOT-01 History and overview [1] ITE-IOT-02 Architecture [6] ITE-IOT-03 Applications [5] ITE-IOT-04 Development [5] ITE-IOT-05 Trends and characteristics [5] ITE-IOT-06 Criticism and controversies [4] ITE-IOT-07 Design principles [4]	**ITA-CCO Cloud Computing** [30 hours] ITA-CCO-01 History and overview [1] ITA-CCO-02 Concepts and fundamentals [6] ITA-CCO-03 Security and data considerations [6] ITA-CCO-04 Applications [5] ITA-CCO-05 Architecture [4] ITA-CCO-06 Development [4] ITA-CCO-07 Serves and platforms [4]
ITA-BDA Big Data [30 hours] ITA-BDA-01 History and overview [1] ITA-BDA-02 Applications [8] ITA-BDA-03 Science and foundations [7] ITA-BDA-04 Infrastructure [5] ITA-BDA-05 Management [5] ITA-BDA-06 Search and mining [4]	**ITA-ANE Applied Networks** [30 hours] ITA-ANE-01 Proprietary networks [8] ITA-ANE-02 Network programming [5] ITA-ANE-03 Voice over IP [5] ITA-ANE-04 Internet routing [4] ITA-ANE-05 Mobile networks [4] ITA-ANE-06 Wireless networks [4]
ITA-IST Integrated Systems Technology [30 hours] ITA-IST-01 History and overview [1] ITA-IST-02 Data mapping and exchange [5] ITA-IST-03 Intersystems communications [5] ITA-IST-04 Software security practices [5] ITA-IST-05 Integrative coding [4] ITA-IST-06 Scripting techniques [4] ITA-IST-07 Miscellaneous issues [3] ITA-IST-08 Overview of programming languages [3]	**ITA-WAP Web Application** [20 hours] ITA-WAP-01 Pattern mining [5] ITA-WAP-02 Text categorization [5] ITA-WAP-03 Web information retrieval [5] ITA-WAP-04 Web engineering [5]
ITA-VIR Virtualization [30 hours] ITA-VIR-01 History and overview [1] ITA-VIR-02 Application of virtualization [5] ITA-VIR-03 Cluster design administration [5] ITA-VIR-04 Network virtualization [5] ITA-VIR-05 Cluster applications [3] ITA-VIR-06 Desktop virtualization [3] ITA-VIR-07 Server virtualization [3] ITA-VIR-08 Cluster software, middleware, tools [2] ITA-VIR-09 Cluster storage and file systems [2] ITA-VIR-10 3D printing [1]	**ITA-CFR Cybersecurity: Forensics and Response** [30 hours] ITA-CFR-01 History and overview [2] ITA-CFR-02 Digital forensics [6] ITA-CFR-03 Characterization and assessment [4] ITA-CFR-04 Concepts and fundamentals [4] ITA-CFR-05 Enabling technologies [4] ITA-CFR-06 Malware strategies and applications [4] ITA-CFR-07 High assurance systems [2] ITA-CFR-08 Personnel and human security [2] ITA-CFR-09 Social dimensions [2]

Related IT Mathematics

Proposed Information Technology Mathematics[6] *Knowledge Areas and Units*	
ITM-CAL Applied Calculus [30 core hours] ITM-CAL-01 History and overview [1] ITM-CAL-02 Derivatives of transcendental functions [4] ITM-CAL-03 Integrals of polynomial functions [4] ITM-CAL-04 Integrals of transcendental functions [4] ITM-CAL-05 Methods of integration [4] ITM-CAL-06 Applications to information technology [3] ITM-CAL-07 Review of polynomial functions [3] ITM-CAL-08 Review of transcendental functions [3] ITM-CAL-09 Derivatives of polynomial functions [2] ITM-CAL-10 Marginal revenues [2]	**ITM-DSC Discrete Structures** [30 core hours] ITM-DSC-01 History and overview [1] ITM-DSC-02 Functions and relations [4] ITM-DSC-03 Graphs and trees [4] ITM-DSC-04 Sets and logic [4] ITM-DSC-05 Applications to information technology [3] ITM-DSC-06 Basics of counting [3] ITM-DSC-07 Boolean algebra principles [3] ITM-DSC-08 Minimization [3] ITM-DSC-09 Proof techniques [3] ITM-DSC-10 Iteration and recursion [2]
ITM-PRO Probability [15 core hours] ITM-PRO-01 History and overview [1] ITM-PRO-02 Continuous probability [4] ITM-PRO-03 Discrete probability [4] ITM-PRO-04 Discrete and continuous functions [3] ITM-PRO-05 Estimation [2] ITM-PRO-06 Applications to information technology [1]	**ITM-STA Statistics** [15 core hours] ITM-STA-01 History and overview [1] ITM-STA-02 Sampling and descriptive statistics [3] ITM-STA-03 Stochastic processes [3] ITM-STA-04 Applications to information technology [2] ITM-STA-05 Correlation and regression [2] ITM-STA-06 Expectation [2] ITM-STA-07 Hypothesis testing [2]

IT Program includes:

290 Essential Hours plus 130 Applied Domains Hours
selected from a possible 260 Hours

Knowledge Areas	Essential Hours	Applied Domains Hours
Essential Only		
Human Computer Interaction	20	0
Information Management	40	0
Social and Professional Issues	30	0
System Administration	20	0
Platform Technologies	20	0
System Integration and Architecture	20	0
Subtotal:	**150**	**0**
Essential + Applied Domains		
Programming / Software Design	30	20
Networking / Applied Networks	40	30
Web Systems and Technologies / Web Application	30	20
Cybersecurity Essential / Cybersecurity: Forensics and Response	40	30
Subtotal:	**140**	**100**
Applied Domains Only		
Integrated Systems Technology	0	30
Green Computing	0	10
Cloud Computing[7]	0	30
Big Data	0	30
Virtualization	0	30
Internet of Things	0	30
Subtotal:	**0**	**160**
IT2017 TOTAL:	**290**	**260**

Proposed – IT2017 Information Technology – Body of Knowledge

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Current – IT2008 Information Technology – Body of Knowledge

Information Technology	*Knowledge Areas and Units*
ITF. Information Technology Fundamentals (25 core hours) ITF. Pervasive Themes in IT (17) ITF. History of Information Technology (3) ITF. IT and Its Related and Informing Disciplines (3) ITF. Application Domains (2)	**PF. Programming Fundamentals (38 core hours)** PF. Fundamental Data Structures (10) PF. Fundamental Programming Constructs (10) PF. Object-Oriented Programming (9) PF. Algorithms and Problem-Solving (6) PF. Event-Driven Programming (3)
HCI. Human Computer Interaction (20 core hours) HCI. Human Factors (6) HCI. HCI Aspects of Application Domains (3) HCI. Human-Centered Evaluation (3) HCI. Developing Effective Interfaces (3) HCI. Accessibility (2) HCI. Emerging Technologies (2) HCI. Human-Centered Computing (1)	**PT. Platform Technologies (14 core hours)** PT. Operating Systems (10) PT. Architecture and Organization (3) PT. Computing Infrastructures (1) PT. Enterprise Deployment Software PT. Firmware PT. Hardware
IAS. Information Assurance and Security (23 core hours) IAS. Fundamental Aspects (3) IAS. Security Mechanisms (Countermeasures) (5) IAS. Operational Issues (3) IAS. Policy (3) IAS. Attacks (2) IAS. Security Domains (2) IAS. Forensics (1) IAS. Information States (1) IAS. Security Services (1) IAS. Threat Analysis Model (1) IAS. Vulnerabilities (1)	**SA. System Administration and Maintenance (11 core hours)** SA. Operating Systems (4) SA. Applications (3) SA. Administrative Activities (2) SA. Administrative Domains (2)
IM. Information Management (34 core hours) IM. IM Concepts and Fundamentals (8) IM. Database Query Languages (9) IM. Data Organization Architecture (7) IM. Data Modeling (6) IM. Managing the Database Environment (3) IM. Special-Purpose Databases (1)	**SIA. System Integration and Architecture (21 core hours)** SIA. Requirements (6) SIA. Acquisition and Sourcing (4) SIA. Integration and Deployment (3) SIA. Project Management (3) SIA. Testing and Quality Assurance (3) SIA. Organizational Context (1) SIA. Architecture (1)
IPT. Integrative Programming & Technologies (23 core hours) IPT. Intersystems Communications (5) IPT. Data Mapping and Exchange (4) IPT. Integrative Coding (4) IPT. Scripting Techniques (4) IPT. Software Security Practices (4) IPT. Miscellaneous Issues (1) IPT. Overview of Programming Languages (1)	**SP. Social and Professional Issues (23 core hours)** SP. Professional Communications (5) SP. Teamwork Concepts and Issues (5) SP. Social Context of Computing (3) SP. Intellectual Property (2) SP. Legal Issues in Computing (2) SP. Organizational Context (2) SP. Professional and Ethical Issues and Responsibilities (2) SP. History of Computing (1) SP. Privacy and Civil Liberties (1)
MS. Math and Statistics for IT (38 core hours) MS. Basic Logic (10) MS. Discrete Probability (6) MS. Functions, Relations and Sets (6) MS. Hypothesis Testing (5) MS. Sampling and Descriptive Statistics (5) MS. Graphs and Trees (4) MS. Application of Math & Statistics to IT (2)	**WS. Web Systems and Technologies (22 core hours)** WS. Web Technologies (10) WS. Information Architecture (4) WS. Digital Media (3) WS. Web Development (3) WS. Vulnerabilities (2) WS. Social Software
NET. Networking (22 core hours) NET. Foundations of Networking (3) NET. Routing and Switching (8) NET. Physical Layer (6) NET. Security (2) NET. Network Management (2) NET. Application Areas (1)	**Total Hours: 314** **Notes:** 1. Order of Knowledge Areas: Fundamentals first, then ordered alphabetically. 2. Order of Units under each Knowledge Area: Fundamentals first (if present), then ordered by number of core hours

ENDNOTES

[1] We base this Version 0.21 on the agreed style.
[2] This Version 0.21 of the IT body of knowledge is derived directly from IT2008. However, in some cases, we have revised them quite significantly; in other cases, the KAs are new after applying future visions of IT.
[3] All knowledge areas contain the prefix "IT-" to distinguish them from knowledge areas related to other curricular reports. "ITE" is used for IT Essential, "ITA" is used for IT Applied Domains and "ITM" is used for Related IT Mathematics.
[4] Core hours for KAs in this Version 0.21 provide guidance and suggestions for any IT program developer. They are empirical and depend on program environment effects. In this version, all KA core hours are multiples of 10.
[5] All knowledge units (KUs) contain the prefix "IT-". The numbering is sequential such as 01, 02, 03, etc.
[6] This mathematics area is an expansion on the mathematics KA from the IT2008 body of knowledge.
[7] It is important to write a paragraph about the relationship between "Cloud Computing" and "Big Data".