SWEBOK KA #11: Related Disciplines of Software Engineering

The Software Engineering Body of Knowledge (SWEBOK) features 11 knowledge areas (KAs). The eleventh KA is Related Disciplines of Software Engineering. The Related Disciplines of Software Engineering KA is focused on the disciplines related to software engineering. It includes eight topics, as shown in Figure 1. These topics are Computer Engineering, Computer Science, Management, Mathematics, Project Management, Quality Management, Software Ergonomics, and Systems Engineering.

Computer Engineering has the following knowledge areas, according to the Computing Curricula 2001 project: Algorithms and Complexity, Computer Architecture and Organization, Computer Systems Engineering, Circuits and Systems, Digital Logic, Discrete Structures, Digital Signal Processing, Distributed Systems, Electronics, Embedded Systems, Human-Computer Interaction, Information Management, Intelligent Systems, Computer Networks, Operating Systems, Programming Fundamentals, Probability and Statistics, Social and Professional Issues, Software Engineering, Test and Verification, and VLSI/ASIC Design.

Computer Science has the following knowledge areas, according to the Computing Curricula 2001 project: Discrete Structures, Programming Fundamentals, Algorithms and Complexity, Architecture and Organization, Operating Systems, Net-Centric Computing, Programming Languages, Human-Computer Interaction, Graphics and Visual Computing, Intelligent Systems, Information Management, Social and Professional Issues, Software Engineering, and Computer Science and Numerical Methods.

Management has the following knowledge areas, according to the European MBA Guidelines: Accounting, Finance, Marketing and Sales, Operations Management, Information Systems Management, Law, Human Resource Management, Economics, Quantitative Analysis, and Business Policy and Strategy.

Mathematics has the following knowledge areas, according to the “Accreditation Criteria and Procedures” report: Linear Algebra, Differential and Integral Calculus, Differential Equations, Probability, Statistics, Numerical Analysis, and Discrete Mathematics.

Project Management has the following knowledge areas, according to PMBOK: Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Human Resource Management, Project Communications Management, Project Risk Management, and Project Procurement Management.

Quality Management has the following knowledge areas, according to ISO 9000-2000: Management and Leadership in Quality Engineering; Quality Systems Development, Implementation, and Verification; Planning, Controlling, and Assuring Product and Process Quality; Reliability and Risk Management; Problem Solving and Quality Improvement; and Quantitative Methods.

Software Ergonomics has the following knowledge areas, according to the ISO Technical Committee 159 on Ergonomics: Cognition, Cognitive AI I: Reasoning, Machine Learning and Grammar Induction, Formal Methods in Cognitive Science: Language, Formal Methods in Cognitive Science: Reasoning, Formal Methods in Cognitive Science: Cognitive Architecture, Cognitive AI II: Learning, Foundations of Cognitive Science, Information Extraction from Speech and Text, Lexical Processing, Computational Language Acquisition, The Nature of HCI, Use and Context of Computers, Human-Machine Fit and Adaptation, Human Characteristics, Computer System and Interface Architecture, Dialogue Architecture, and Development Process.

Systems Engineering has the following knowledge areas, according to INCOSE: Business Processes and Operational Assessment, System/Solution/Test Architecture, Life Cycle Cost & Cost-Benefit Analysis, Serviceability/Logistics, Modeling, Simulation, & Analysis, and Management: Risk, Configuration, and Baseline.



Figure 1. Breakdown of Topics for the Related Disciplines of Software Engineering Knowledge Area