Software Development (Training Road Map)

2010

IT Skill Standards Center

IT Human Resources Development Headquarters

INFORMATION-TECHNOLOGY PROMOTION AGENCY (IPA), JAPAN

Ministry of Economy, Trade and Industry

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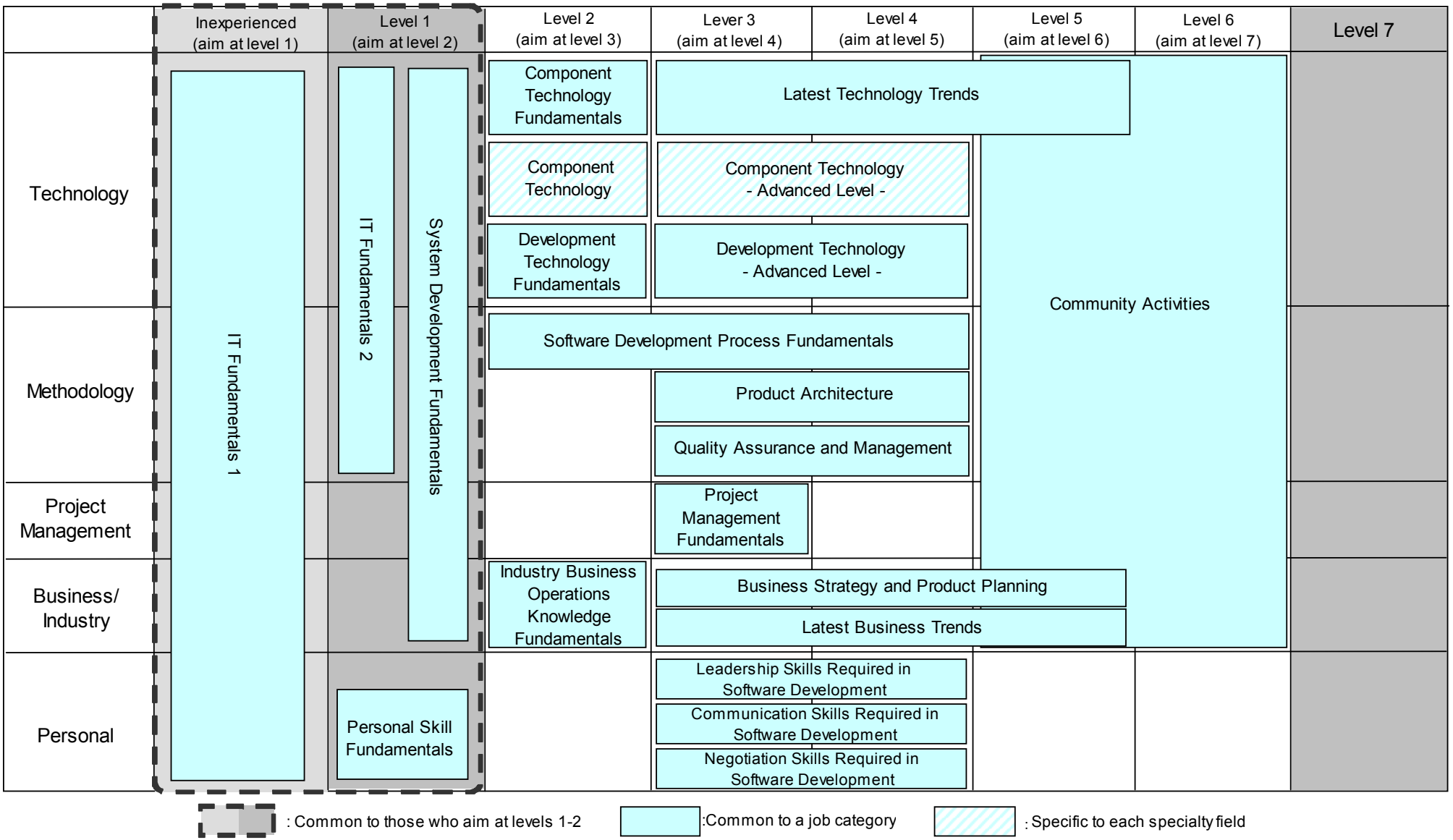
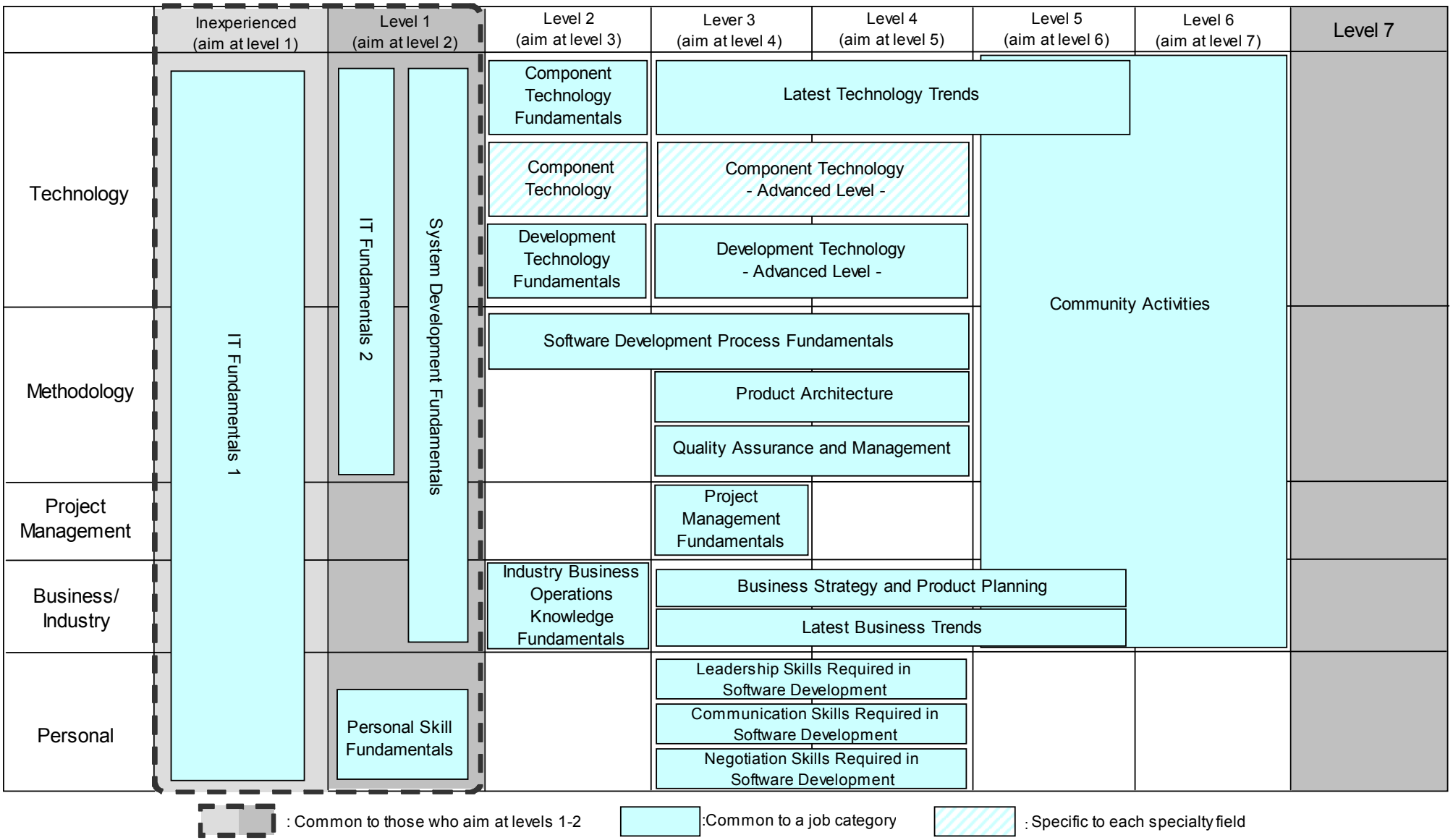
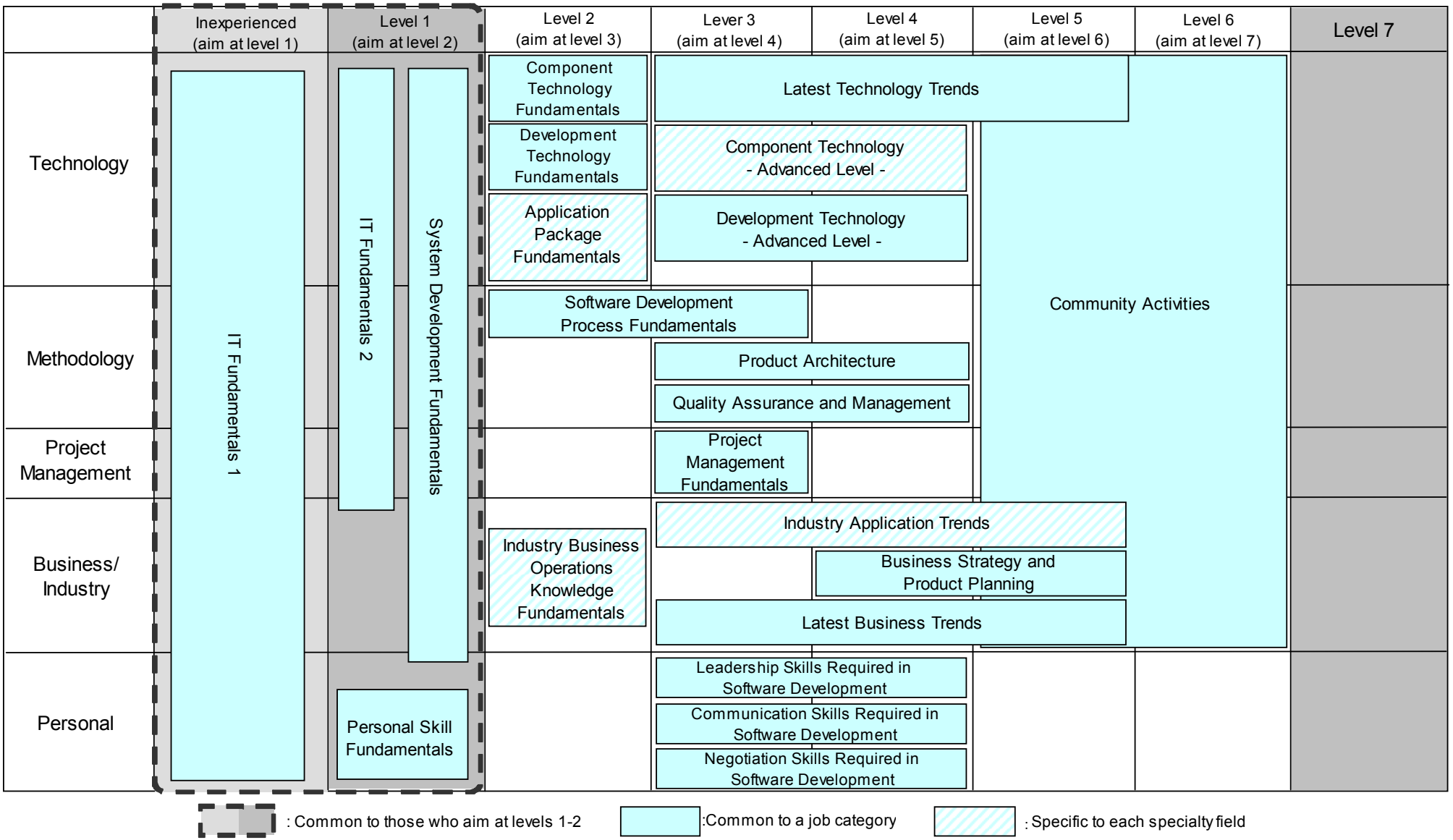
Software Development (Operating System) Training Course Group



Software Development (Middleware) Training Course Group



Software Development (Application Software) Training Course Group



Software Development (Operating System) Course List

Training Course Level		Training Course Group Name	Training Course Name	Method			Standard Duration		Page
				E-Learning	Lecture	Workshop	E-Learning (Total hours)	Class (Total days)	
Common to Job Category	Basic Course	Development Technology Fundamentals	Overviews of International Standards and De Facto Standards	*			6		13
			Platform Component Technology	*			18		15
		Project Management Fundamentals	Project Management Fundamentals	*			30		18
		Software Development Process Fundamentals	Software Development Process Fundamentals		*			3	21
			Software Product Development Methodology		*	*		5	24
		Component Technology Fundamentals	Component Technology Fundamentals	*			12		27
			Globalization	*	*		6	1	29
			Accessibility	*	*		6	1	31
			Security Component Technology	*	*		18	3	33
			Network Component Technology	*			12		35

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Software Development (Operating System) Course List

Training Course Level		Training Course Group Name	Training Course Name	Method			Standard Duration		Page
				E-Learning	Lecture	Workshop	E-Learning (Total hours)	Class (Total days)	
Common to Job Category	Advanced Course	Business Strategy and Product Planning	Software Business Planning		*	*		2	38
			Business Processes		*			2	40
		Product Architecture	Product Architecture Case Studies		*	*		3	43
		Quality Assurance and Management	Quality Management System		*	*		2	46
			Test Planning and Management and Assessment		*			3	48
			Exercises in Problem Analysis		*	*		2	50
			Performance Planning and Management and Assessment		*	*		3	52
		Development Technology - Advanced Level -	Information Development		*			1	55
			Human-centered Design		*	*		2	57
		Leadership Skills Required in Software Development	Leadership Skills Required in Software Development			*		3	60
		Communication Skills Required in Software Development	Communication Skills Required in Software Development			*		3	63
		Negotiation Skills Required in Software Development	Negotiation Skills Required in Software Development			*		3	66
	Special Course	Latest Technology Trends	Latest Technology Trends		*			1	69
		Latest Business Trends	Latest Business Trends	*	*		3	0.5	72
		Community Activities	Community Activities	-	-	-	-	-	75
Specific to Each Specialty Field <Selective Courses>	Basic Course	Component Technology	Operating System Component Technology		*	*		5	78
			Workshops on Device Driver Development			*		5	80
	Advanced Course	Component Technology - Advanced Level -	Operating System Component Technology - Advanced Level -		*			5	95

Software Development (Middleware) Course List

Training Course Level		Training Course Group Name	Training Course Name	Method			Standard Duration		Page
				E-Learning	Lecture	Workshop	E-Learning (Total hours)	Class (Total days)	
Common to Job Category	Basic Course	Development Technology Fundamentals	Overviews of International Standards and De Facto Standards	*			6		13
			Platform Component Technology	*			18		15
		Project Management Fundamentals	Project Management Fundamentals	*			30		18
		Software Development Process Fundamentals	Software Development Process Fundamentals		*			3	21
			Software Product Development Methodology		*	*		5	24
		Component Technology Fundamentals	Component Technology Fundamentals	*			12		27
			Globalization	*	*		6	1	29
			Accessibility	*	*		6	1	31
			Security Component Technology	*	*		18	3	33
			Network Component Technology	*			12		35

Software Development (Middleware) Course List

Training Course Level		Training Course Group Name	Training Course Name	Method			Standard Duration		Page
				E-Learning	Lecture	Workshop	E-Learning (Total hours)	Class (Total days)	
Common to Job Category	Advanced Course	Business Strategy and Product Planning	Software Business Planning		*	*		2	38
			Business Processed		*			2	40
		Product Architecture	Product Architecture Case Studies		*	*		3	43
		Quality Assurance and Management	Quality Management System		*	*		2	46
			Test Planning and Management and Assessment		*			3	48
			Exercises in Problem Analysis		*	*		2	50
			Performance Planning and Management and Assessment		*	*		3	52
		Development Technology - Advanced Level -	Information Development		*			1	55
			Human-centered Design		*	*		2	57
		Leadership Skills Required in Software Development	Leadership Skills Required in Software Development			*		3	60
		Communication Skills Required in Software Development	Communication Skills Required in Software Development			*		3	63
		Negotiation Skills Required in Software Development	Negotiation Skills Required in Software Development			*		3	66
	Special Course	Latest Technology Trends	Latest Technology Trends		*			1	69
		Latest Business Trends	Latest Business Trends	*	*		3	0.5	72
		Community Activities	Community Activities	-	-	-	-	-	75
Specific to Each Specialty Field <Selective Courses>	Basic Course	Component Technology	Middleware Component Technology		*			5	82
	Advanced Course	Component Technology - Advanced Level -	Middleware Component Technology - Advanced Level -		*			3	97
			Security Design - Advanced Level -	*	*		30	5	101

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Software Development (Application Software) Course List

Training Course Level		Training Course Group Name	Training Course Name	Method			Standard Duration		Page
				E-Learning	Lecture	Workshop	E-Learning (Total hours)	Class (Total days)	
Common to Job Category	Basic Course	Development Technology Fundamentals	Overviews of International Standards and De Facto Standards	*			6		13
			Platform Component Technology	*			18		15
		Project Management Fundamentals	Project Management Fundamentals	*			30		18
		Software Development Process Fundamentals	Software Development Process Fundamentals		*			3	21
			Software Product Development Methodology		*	*		5	24
		Component Technology Fundamentals	Component Technology Fundamentals	*			12		27
			Globalization	*	*		6	1	29
			Accessibility	*	*		6	1	31
			Security Component Technology	*	*		18	3	33
			Network Component Technology	*			12		35

Software Development (Application Software) Course List

Training Course Level		Training Course Group Name	Training Course Name	Method			Standard Duration		Page
				E-Learning	Lecture	Workshop	E-Learning (Total hours)	Class (Total days)	
Common to Job Category	Advanced Course	Business Strategy and Product Planning	Software Business Planning		*	*		2	38
			Business Processed		*			2	40
		Product Architecture	Product Architecture Case Studies		*	*		3	43
		Quality Assurance and Management	Quality Management System		*	*		2	46
			Test Planning and Management and Assessment		*			3	48
			Exercises in Problem Analysis		*	*		2	50
			Performance Planning and Management and Assessment		*	*		3	52
		Development Technology - Advanced Level -	Information Development		*			1	55
			Human-centered Design		*	*		2	57
		Leadership Skills Required in Software Development	Leadership Skills Required in Software Development			*		3	60
		Communication Skills Required in Software Development	Communication Skills Required in Software Development			*		3	63
		Negotiation Skills Required in Software Development	Negotiation Skills Required in Software Development			*		3	66
	Special Course	Latest Technology Trends	Latest Technology Trends		*			1	69
		Latest Business Trends	Latest Business Trends	*	*		3	0.5	72
		Community Activities	Community Activities	-	-	-	-	-	75
Specific to Each Specialty Field <Selective Courses>	Basic Course	Industry Business Operations Knowledge Fundamentals	Industry Business Operations Knowledge Fundamentals	*	*		12		85
		Industry Application Trends	Industry Application Trends	*	*		12	2	88
		Application Package Fundamentals	Application Package Fundamentals	*	*	*	18	3	91
	Advanced Course	Component Technology - Advanced Level -	Application Package Installation (Each Product)	-	-	-	-	-	99
			Security Design - Advanced Level -	*	*		30	5	101

Software Development
Training Course Description
<Common to Software Development>

Development Technology Fundamentals (2 courses)

- Overviews of International Standards and De Facto Standards
- Platform Component Technology

Course Name / Content	Overviews of International Standards and De Facto Standards
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees acquire knowledge of standards commonly utilized in design and development of software products. ○The attendees learn the following that are important in development of software: present conditions of international standards and de facto standards, how to adopt various standards, and relationships between standards and products. ○The attendees learn roles of major standards among others, activities of standards groups relevant to the major standards, and where and how to get information of standards.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development level 3)
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge.
Training Method	E-learning
Duration	Standard term: 6 hours (e-learning 6 hours/day x 1 day)
Learning Goal	Can understand relevant standards of a software product and apply the standards to the software product as a member of a software product development team by utilizing knowledge of standards.

Skill Items	Knowledge Items
Software Engineering	-Security and Privacy Security Measures (Secret Preservation, Measures for Prevention of Falsification, Intrusion Prevention, Computer Virus, Integrity Measures, Availability Measures, Safety Measures, Social Engineering), Privacy Protection, Risk Management, Guidelines and Relevant Regulations
Development Methods Design	-Selection of Adaptive Standards International Standards, Industrial Standards, De Facto Standards, In-House Standards
Analysis and Requirements Definition	-Globalization Response to Region- and Country-Specific Relevant Laws and Regulations and Specifications, Multi Language Support, Standards and Architecture such as Unicode, POSIX-defined Globalization Model, CDRA (Character Data Representation Architecture) -Industry and Technology Trends International Standards, De facto Standards, High-Technology, Remarkable Technology -Knowledge of Relevant Laws and Regulations Understanding and Compliance of Relevant Regulations

Course Name / Content	Platform Component Technology
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees acquire knowledge of architecture that determines performance of products that are platform components, and component technology that are applied in the products. ○The attendees learn major hardware products, major system software products, and the latest component technology trends implemented in middleware.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development level 3)
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge.
Training Method	E-learning
Duration	Standard term: 18 hours (e-learning 6 hours/day x 3 days)
Learning Goal	Can develop and implement a system product under supervision of a superior as a member of a software product development team by utilizing fundamental knowledge of platform architecture and platform products.

Skill Items	Knowledge Items
Technology	-Understanding and Utilization of Computer System Architecture and Fundamental Technologies -Operating System Fundamentals Mainframe OS, Small Business Computer Proprietary OS, Unix, Windows, Linux, Embedded Device OS

Project Management Fundamentals (1 course)

●Project Management Fundamentals

Course Name / Content	Project Management Fundamentals
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees acquire fundamental knowledge of project management. ○The attendees learn, based on "PMBOK," a general concept of project management that covers all aspect of basic project management knowledge (e.g., project definitions, organization, plan formulation, schedule plan, project implementation, project management, and project completion) and that is not biased by characteristics of any industries or fields.
Attendee	Those who have participated in projects of system development and others and who aspire to lead software product development teams (whose who aim to acquire the knowledge e of Software Development level 4)
Precondition	Possess fundamental knowledge of IT and system development and have participated in projects of system development and others.
Training Method	E-learning
Duration	Standard term: 30 hours (6 hours/day x 5 days)
Learning Goal	Can complete a project based on a project plan as a leader of a software product development team by utilizing fundamental knowledge of project management.

Skill Items	Knowledge Items
Project Management	-Project Integration Management Develop Project Charter, Develop Preliminary Project Scope Statement, Develop Project Management Plan, Direct and Manage Project Execution, Monitor and Control Project Work, Integrated Change Control, Close Project -Project Scope Management Scope Planning, Scope Definition, Create WBS, Scope Verification, Scope Control -Project Time Management Activity Definition, Activity Sequencing, Activity Resource Estimating, Activity Duration Estimating, Schedule Development, Schedule Control -Project Cost Management Cost Estimating, Cost Budgeting, Cost Control -Project Quality Management Quality Planning, Perform Quality Assurance, Perform Quality Control -Project Human Resource Management Human Resource Planning, Acquire Project Team, Develop Project Team, Manage Project Team Project Communications Management Communications Planning, Information Distribution, Performance Reporting, Manage Stakeholders -Project Risk Management Risk Management Planning, Risk Identification, Qualitative Risk Analysis, Quantitative Risk Analysis, Risk Response Planning, Risk Monitoring and Control -Project Procurement Management Plan Purchases and Acquisitions, Plan Contracting, Request Seller Responses, Select Sellers, Contract Administration, Contract Closure

Software Development Process Fundamentals (2 courses)

- Project Management Fundamentals
- Software Product Development Methodology

Course Name / Content	Software Development Process Fundamentals
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees acquire fundamental knowledge, which are important for of various methods to be utilized in basic processes, development processes, and testing processes, all of which are important for software product developers. ○The attendees learn development standards, development guides, quality management system, fundamental knowledge of process management, rules of confidential information handling in information assets, procedures for change control and problem management. ○The attendees learn an overview and roles of documents to be prepared for software development such as requirements specifications, design specifications, and test implementation plans.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development level 3 or 4)
Precondition	Have completed System Development Fundamentals course group and Project Management Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture
Duration	Standard term: 3 days (classroom)
Learning Goal	Can develop a software product as a leader or a member of a software product development team by utilizing fundamental knowledge of software development processes.

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Skill Items	Knowledge Items
Software Engineering	-Testing Techniques Test Case Design, Specification Determination, Test Environment Set-up, Management, Test Data Preparation, Test Tool Utilization Technology Verification Methods Prototyping, Simulation, Modeling -Information Development Design and Development of Product Information -Software Design (Software Development) Selection and Utilization of Optimal Methodology, Creation of Application Guidance, Implementation of Standardization (Coding Standards), Selection of Reuse Software Components, Identification of Technology to be Verified -Product Security Handling Rules of Confidential Information as Information Assets, Creation of Security Plan such as Preventive Measures against Virus for Development Environment and Products, Creation of security plans
Development Methods Design	-Selection of Adaptive Standards International Standards, Industrial Standards, De Facto Standards, In-House Standards -Software Development Process Positioning in Business Process, Development Plan Creation (Subprocess, Measurement, Personnel Assignment, Tools, Deliverables, etc.), Specifications and Models relating to Software Development -Quality Inspection (Software Development) Design Review, Code Review, Function Test, Integration Test, Performance Test, Durability Test, Usability Test -Creation of Test Implementation Plan

Skill Items	Knowledge Items
Analysis and Requirements Definition	-Globalization Response to Region- and Country-Specific Relevant Laws and Regulations and Specifications, Multi Language Support, Standards and Architecture such as Unicode, POSIX-defined Globalization Model, CDRA Character Data Representation Architecture) -Intellectual Property Right -Human-centered Design -Accessibility (Software Development) Accessibility Function of Various Systems, Country Specific Guidelines and Regulations -Knowledge of Relevant Laws and Regulations Understanding and Compliance of Relevant Regulations
Project Management	-Project Quality Management Quality Planning, Perform Quality Assurance, Perform Quality Control

Course Name / Content	Software Product Development Methodology
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees acquire knowledge of software product development methodology important for projects of software product development. ○The attendees learn how to apply an IPD (Integrated Product Development) methodology to a series of life cycle of software product development (e.g., development planning, requirements definition, design, development, testing, shipping, sale, maintenance, end of sale, and end of maintenance). The IPD methodology includes management process, tools and techniques, intellectual property, patents, and software product relevant knowledge based on the IPD methodology ○The attendees learn in lectures a project management theory utilizing IPD methods, and the attendees learn in workshops how to apply project management theory and review examples of the application methods.
Attendee	Those who have participated in software product development as members of design or development of software product projects (those who aim to acquire the knowledge of Software Development level 3 or 4)
Precondition	Have completed System Development Fundamentals course group and Project Management Fundamentals course group.
Training Method	Lecture, Workshop
Duration	Standard term: 5 days (classroom)
Learning Goal	Can design new software and existing software and manage development of the new software and existing software as a leader of a software product development team by utilizing software product development methodology.

Skill Items	Knowledge Items
Design	-Estimation and Schedule Methods Scale Estimation (LOC/ Function Point/ COCOMO, etc.), Schedule Optimization(Critical Path, PERT, Gantt Chart, etc.)
Development Methods Design	-Software Development Process Positioning in Business Process, Development Plan Creation (Subprocess, Measurement, Personnel Assignment, Tools, Deliverables, etc.), Specifications and Models relating to Software Development
Analysis and Requirements Definition	-Formulation of Project and Plan Understanding of Customer Required Specifications, Formulation of Software Product Planning, Proposal of Software Product Planning, Formulation of Software Product Development Plan, Understanding for Investment and Loss/Profit Model in Software Product -Globalization Response to Region- and Country-Specific Relevant Laws and Regulations and Specifications, Multi Language Support, Standards and Architecture such as Unicode, POSIX-defined Globalization Model, CDRA (Character Data Representation Architecture)

Component Technology Fundamentals (5 courses)

- Component Technology Fundamentals
- Globalization
- Accessibility
- Security Component Technology
- Network Component Technology

Course Name / Content	Component Technology Fundamentals
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This is the subsequent course of System Development Fundamentals course group. Attendees acquire knowledge of component technology of hardware and software, and technology and concepts of applied to various products utilized in information systems in order to keep product knowledge updated for latest hardware and software. ○The attendees learn product knowledge on each field or theme necessary for future job assignment. The attendees select a field or theme at regular intervals or when needed. The contents are: component technology applied in major current hardware, concepts, principles, mechanisms, architecture, advantages / disadvantages of software utilized in variety of information systems, characteristics of the software in usage, design , development, operation perspectives.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development level 3 or 4)
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge.
Training Method	E-learning
Duration	Standard term: 12 hours (e-learning 6hours/day x 2 days)
Learning Goal	Can explain effectiveness of a software product and apply it to system development as a member of a software product development team based on understanding of purposes and characteristics of the software product to be foundations of IT.

Skill Items	Knowledge Items
Technology	-Latest Technology Trends Understanding of Latest Hardware Technology Trends, Understanding of Latest Middleware Technology Trends, Understanding of Latest Platform Technology Trends, Understanding of Latest Network Technology Trends, Understanding of Latest Database Technology Trends, Understanding of Latest Security Technology Trends, Understanding of Latest System Management Technology Trends

Course Name / Content	Globalization
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees learn fundamental knowledge of technology (e.g., program structure, code pages, locales, and subroutines) important for response to globalization in processes of software product development. ○The attendees learn development processes, standards, architecture, and guidelines within and outside companies in order for their software products to achieve customers' needs around the world.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development level 3)
Precondition	Have completed System Development Fundamental course group, or posses equivalent knowledge.
Training Method	E-learning or Lecture
Duration	Standard term: 6 hours (e-learning 6 hours/day x 1 day) or Standard term: 1 day (classroom)
Learning Goal	Can develop a software product that achieves customers' needs of the software product around the world as a member of a software product development team by utilizing knowledge of globalization .

Skill Items	Knowledge Items
Software Engineering	-Information Development Design and Development of Product Information
Analysis and Requirements Definition	-Globalization Response to Region- and Country-Specific Relevant Laws and Regulations and Specifications, Multi Language Support, Standards and Architecture such as Unicode, POSIX-defined Globalization Model, CDRA (Character Data Representation Architecture) -Industry and Technology Trends International Standards, De facto Standards, High-Technology, Remarkable Technology

Course Name / Content	Accessibility
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees learn situations behind accessibility of software products, laws to be observed for accessibility, and important technology for accessibility. ○The attendees learn differences, characteristics, and present situations of laws and regulations among countries.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development level 3)
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge.
Training Method	E-learning or Lecture
Duration	Standard term: 6 hours (e-learning 6 hours/day x 1 day) or Standard term: 1 day (classroom)
Learning Goal	Can apply fundamental accessibility knowledge to development of a software product as a member of a software product development team by the knowledge.

Skill Items	Knowledge Items
Analysis and Requirements Definition	-Human-centered Design -Accessibility (Software Development) Accessibility Function of Various Systems, Country Specific Guidelines and Regulations

Course Name / Content	Security Component Technology
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This is one of the courses in Component Technology Fundamentals course group, which is the subsequent of System Development Fundamentals course group. Attendees acquire knowledge of important component technology enabling security functions. ○The attendees understand technology and concepts of security and learn security technology trends and major security products. ○To provide lectures via e-learning type methods is possible; however, to give a demonstration of how products work at a lecture is recommended.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development level 3)
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture or E-learning
Duration	Standard term: 3 days (classroom) or Standard term: 18 hours (e-learning 6 hours/day x 3 days)
Learning Goal	Can implement security functions of a software product according to existing operations standards and guidance as a member of a software product development team by utilizing fundamental knowledge of security technology components.

Skill Items	Knowledge Items
Software Engineering	-Implementation and Inspection of Security Systems Selection and Installation of Security Products and Tools, Security System Development, Security Techniques Implementation -Security and Privacy Security Measures (Secret Preservation, Measures for Prevention of Falsification, Intrusion Prevention, Computer Virus, Integrity Measures, Availability Measures, Safety Measures, Social Engineering), Privacy Protection, Risk Management, Guidelines and Relevant Regulations
Technology	-Internet Technologies Internet History, Web Related Technologies, Technologies relating to Mails, Cryptographic Technology, Digital Media Related Technology, (VoIP, Streaming, QoS, etc) -Parallel Processing Programming Techniques -Web Application Technologies HTML, Servlet, EJB, J2EE, JSP, JSF, Various Markup Languages based on XML and XML, Web Services (SOA, SOAP, WSDL, UDDI, WS-Security, etc.)

Course Name / Content	Network Component Technology
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This is one of the courses of Component Technology - Advanced Level - course group, which is the subsequent of Component Technology Fundamentals course group. Attendees acquire knowledge of component technology in network systems. ○The attendees learn important technology in network systems, technology around network systems, knowledge of major network products and services, and network technology trends.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development level 3)
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge.
Training Method	E-learning
Duration	Standard term: 12 hours (e-learning 6 hours/day x 2 days)
Learning Goal	Can implement network technology in a software product as a member of a software product development team by utilizing fundamental knowledge of network technology components.

Skill Items	Knowledge Items
Technology	-Internet Application Fundamental Technology Basic Structure of Application Server System, Basic Requirements of Application Server System (Throughput, Aggression resistance, Fault-Tolerant Operation, Expandability, etc.) -Internet Technologies Internet History, Web Related Technologies, Technologies relating to Mails, Cryptographic Technology, Digital Media Related Technology, (VoIP, Streaming, QoS, etc) -Parallel Processing Programming Techniques -Middleware Technologies Understanding and Utilization for Structure of Web and CGI, JSP and EJB -Web Application Technologies HTML, Servlet, EJB, J2EE, JSP, JSF, Various Markup Languages based on XML and XML, Web Services (SOA, SOAP, WSDL, UDDI, WS-Security, etc.)
Analysis and Requirements Definition	-Industry and Technology Trends International Standards, De facto Standards, High-Technology, Remarkable Technology

Business Strategy / Product Planning (2 courses)

- Software Business Planning
- Business Processes

Course Name / Content	Software Business Planning
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This course helps attendees acquire knowledge and techniques necessary for understanding and analyzing market trends and customers' needs to formulate product strategies, to make business plans (investment, loss/profit models) for software product development, and to draw up product development plans and quality plans. Training contents above are often related to corporate strategies, and it is assumed that attendees' companies provide the training contents. ○One training day is for acquiring general knowledge and techniques through lectures, and the other training day is for performing case studies through workshops. ○The attendees learn how to segment markets and select functions in order to fulfill customers' requirements, and attendees understand roles and processes of marketing management in formulation of product strategies.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as persons responsible for or leaders of software product development teams (those who aim to acquire the knowledge of Software Development level 5 or 6)
Precondition	Have completed Software Development Process Fundamentals course group and Marketing Management Fundamentals course group, or posses equivalent knowledge.
Training Method	Lecture, Workshop
Duration	Standard term: 2 days (classroom)
Learning Goal	Can formulate a business plan of a software product as a person responsible for of a software product development team by utilizing practical knowledge of business planning.

Skill Items	Knowledge Items
Analysis and Requirements Definition	-Understanding of Market Trends and Competitive Trends Information Collection, Information Analysis, Understanding of Market Trends and Competitive Trends -Formulation of Software Product Strategy Customer Segment Analysis, Demand Analysis, SWOT Analysis, Formulation of Software Product Strategy, Understanding of Own Company Strategy -Formulation of Project and Plan Understanding of Customer Required Specifications, Formulation of Software Product Planning, Proposal of Software Product Planning, Formulation of Software Product Development Plan, Understanding for Investment and Loss/Profit Model in Software Product

Course Name / Content	Business Processes
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This course helps attendees acquire practical knowledge of the following: business processes related to software product development, handling of internal and external intellectual property, relevant laws and various regulations, standards relevant knowledge and quality planning, and risk management processes. Training contents above depend on corporate standards guides and business processes, and this course is assumed to be held by and within attendees' companies.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as persons responsible for or leaders of software product development teams (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Have completed Software Development Fundamental course group, or possess equivalent knowledge.
Training Method	Lecture
Duration	Standard term: 2 days (classroom)
Learning Goal	Can formulate a business strategy and product plan of a software product as a person responsible for of software product development by utilizing practical knowledge of business processes related to software product development.

Skill Items	Knowledge Items
Software Engineering	-System Audit System Audit Fundamentals, System Audit Planning, System Audit Implementation and Report
Development Methods Design	-Software Development Process Positioning in Business Process, Development Plan Creation (Subprocess, Measurement, Personnel Assignment, Tools, Deliverables, etc.), Specifications and Models relating to Software Development -Creation of Test Implementation Plan
Analysis and Requirements Definition	-Formulation of Software Product Strategy Customer Segment Analysis, Demand Analysis, SWOT Analysis, Formulation of Software Product Strategy, Understanding of Own Company Strategy -Formulation of Project and Plan Understanding of Customer Required Specifications, Formulation of Software Product Planning, Proposal of Software Product Planning, Formulation of Software Product Development Plan, Understanding for Investment and Loss/Profit Model in Software Product -Management of Business Issues Issue Discovery, Review of Solutions, Problem Solving -Intellectual Property -Knowledge of Relevant Laws and Regulations Understanding and Compliance of Relevant Regulations
Project Management	-Project Quality Management Quality Planning, Perform Quality Assurance, Perform Quality Control

Product Architecture (1 course)

●Product Architecture Case Studies

Course Name / Content	Product Architecture Case Studies
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This course helps attendees learn, by using existing architecture of different products as examples, idea screening of market demands (requirements analysis for new product development), possibility of leading-edge technology, potential of architecture (flexibility, expandability). ○Explanations of the following are provided through performing case studies: a concept of architecture, how to adopt market needs into product's architecture, requirements and constraints necessary to select and apply advanced technology, effectiveness of technology prototyping, possibility ,flexibility, and expandability of architecture.
Attendee	Those who have participated in projects as leaders or members of software product development teams and who are going to lead architecture related affairs of software products (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Posses fundamental knowledge of IT and system development and have participated in projects as technical team members.
Training Method	Lecture, Workshop
Duration	Standard term: 3 days (classroom)
Learning Goal	Can understand architecture design of a software product. Can design architecture as a person responsible for or a leader of a software product development team by utilizing knowledge of architecture design and the latest technology.

Skill Items	Knowledge Items
Technology	−Understanding and Utilization of Computer System Architecture and Fundamental Technologies
Design	-Understanding and Utilization of Modeling Techniques Utilization and Practice of Data Modeling Techniques, Utilization and Practice of Process Modeling Techniques, Utilization and Practice of Performance Modeling Techniques, Utilization and Practice of Prototyping Techniques, Utilization and Practice of Benchmarking Techniques -Architecture Process Abstraction of Market Demand, Possibility of Advanced Technology, Possibility of Architecture (Flexibility, Expandability), Effectiveness of Technology Prototyping
Analysis and Requirements Definition	-Industry and Technology Trends International Standards, De fact Standards, High-Technology, Remarkable Technology

Quality Assurance and Management (4 courses)

- Quality Management System
- Test Planning and Management and Assessment
- Exercises in Problem Analysis
- Performance Planning and Management and Assessment

Course Name / Content	Quality Management System
Training Course Level	入門講座 □基礎講座 ■上級講座 □特別講座□Introductory Course □Basic Course ■Advanced Course □Special Course
Training Area (Common or Specialty Field)	■Common to Software Development □Operating System □Middleware □Application Software
Outline	Aim: Attendees acquire knowledge of how to apply quality management system processes important for fulfilling customers' requirements of both project management processes and project outcomes in medium-sized, large-sized, or high-complex projects. ○The attendees learn entire quality management system including quality management system processes (e.g., quality planning, quality assurance, and quality control), quality management system tools, quality management system techniques, and quality management system outcomes. The attendees also learn association of quality management system processes with ISO9000 and CMMI. ○In addition to theories of quality management system in lectures, the attendees learn in workshops practical quality management system important for provision of high-level quality achieving customers' needs in projects with any degrees of complexity and difficulty.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as leaders or members of software product development teams (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Have completed Practice of Project Management course group, or possess equivalent knowledge.
Training Method	Lecture, Workshop
Duration	Standard term: 2 days (classroom)
Learning Goal	Can perform activities of quality management system in all project processes as a person responsible for or a leader of a software product development team by utilizing knowledge of how to apply quality management system processes.

Skill Items	Knowledge Items
Development Methods Design	-Fundamentals of Risk Management Formulation of Risk Management Plan, Risk Identification, Qualitative Risk Analysis, Quantitative Risk Analysis, Formulation of Risk Response Plan, Risk Monitoring and Management -Software Development Process Positioning in Business Process, Development Plan Creation (Subprocess, Measurement, Personnel Assignment, Tools, Deliverables, etc.), Specifications and Models relating to Software Development -Quality Inspection (Software Development) Design Review, Code Review, Function Test, Integration Test, Performance Test, Durability Test, Usability Test -Creation of Test Implementation Plan
Project Management	-Project Quality Management Quality Planning, Perform Quality Assurance, Perform Quality Control

Course Name / Content	Test Planning and Management and Assessment
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This course helps attendees learn testing process skills related to development of software. ○The attendees learn test types and their purposes in each phase of software development processes, and attendees acquire knowledge of how to formulate effective test plans, manage tests, assess test results, and predict software quality after shipment.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as leaders or members of software product development teams (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Have completed Practice of Project Management course group, or possess equivalent knowledge.
Training Method	Lecture
Duration	Standard term: 3 days (classroom)
Learning Goal	Can create a test plan, manage a test, and assess test results as a person responsible for or a leader of a software product development team by utilizing practical testing knowledge.

Skill Items	Knowledge Items
Software Engineering	-Utilization of Development Support Tools Development Environment, Various Application Development Tools, Management Tools and Debugger and Simulator, etc. Testing Techniques Test Case Design, Specification Determination, Test Environment Set-up, Management, Test Data Preparation, Test Tool Utilization
Development Methods Design	-Quality Inspection (Software Development) Design Review, Code Review, Function Test, Integration Test, Performance Test, Durability Test, Usability Test -Creation of Test Implementation Plan
Project Management	-Project Quality Management Quality Planning, Perform Quality Assurance, Perform Quality Control

Course Name / Content	Exercises in Problem Analysis
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This course helps attendees acquire practical knowledge of how to analyze problems occurring in development or maintenance of software. ○The attendees learn practical knowledge of how to handle problems, assess the problem handling, and manage feedback process through workshops exercises in problem analysis by using examples of problem management and reporting.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as leaders or members of software product development teams (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Have completed Practice of Project Management course group, or possess equivalent knowledge.
Training Method	Lecture, Workshop
Duration	Standard term: 2 days (classroom)
Learning Goal	Can analyze and handle problems and go through assessment processes as a person responsible for or a leader of a software product development team by utilizing practical knowledge of problem analysis.

Skill Items	Knowledge Items
Software Engineering	-Utilization of Development Support Tools Development Environment, Various Application Development Tools, Management Tools and Debugger and Simulator, etc. -Technological Problem Solving Methods Utilization and Practice of Technological Problem Solving Method
Project Management	-Project Quality Management Quality Planning, Perform Quality Assurance, Perform Quality Control

Course Name / Content	Performance Planning and Management and Assessment
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This course helps attendees acquire practical knowledge of performance planning, management, and assessment of software products. ○The attendees learn how to set performance targets of software products in design processes, how to realize the performance targets in development processes, how to measure, manage, and evaluate performance in testing processes, and how to formulate performance plans. ○Explanations of the following are provided: performance evaluation and reexamination of modeling techniques, impact and arrangement of operations to achieve performance targets, modeling techniques and simulation techniques to handle technologically complex systems. ○To combine workshops and lectures to acquire practical knowledge is recommended.
Attendee	Possess fundamental knowledge of architecture design, development, and modeling and have designed and developed system architecture by utilizing the knowledge (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Have completed Modeling Fundamental course, or possess equivalent knowledge.
Training Method	Lecture, Workshop
Duration	Standard term: 3 days (classroom)
Learning Goal	Can improve performance based on understanding of architecture. Can realize architecture to improve performance as a person responsible for or a leader of a software product development team by utilizing knowledge of entire architecture (e.g., applications, data services, networks, security, and system operations).

Skill Items	Knowledge Items
Software Engineering	-Technological Problem Solving Methods Utilization and Practice of Technological Problem Solving Method
Design	-Understanding and Utilization of Modeling Techniques Utilization and Practice of Data Modeling Techniques, Utilization and Practice of Process Modeling Techniques, Utilization and Practice of Performance Modeling Techniques, Utilization and Practice of Prototyping Techniques, Utilization and Practice of Benchmarking Techniques
Development Methods Design	-Quality Inspection (Software Development) Design Review, Code Review, Function Test, Integration Test, Performance Test, Durability Test, Usability Test -Creation of Test Implementation Plan
Project Management	-Project Quality Management Quality Planning, Perform Quality Assurance, Perform Quality Control

Development Technology - Advanced Level - (2 courses)

- Information Development
- User-centered Design

Course Name / Content	Information Development
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This course helps attendees learn development of information contents (information development) such as product manuals, help screens, dialogues, menus, messages, icons. ○The attendees learn what can be information contents, development processes, and development tools. ○The attendees also acquire techniques for enabling friendly information presentation.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as leaders or members of software product development teams (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Have completed System Development Fundamentals course group and Development Technology Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture
Duration	Standard term: 1 day (classroom)
Learning Goal	Can develop information contents as a person responsible for or a leader of software product development team by utilizing fundamental knowledge of information development.

Skill Items	Knowledge Items
Software Engineering	-Information Development Design and Development of Product Information
Development Methods Design	-Quality Inspection (Software Development) Design Review, Code Review, Function Test, Integration Test, Performance Test, Durability Test, Usability Test
Analysis and Requirements Definition	-Human-centered Design -Accessibility (Software Development) Accessibility Function of Various Systems, Country Specific Guidelines and Regulations

Course Name / Content	Human-centered Design
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: This course helps attendees acquire knowledge necessary for various activities (users' usage analysis, definition of requirements specifications, considerations on usability, formulation of assessment standards and assessment work) by utilizing techniques of human-centered design that is an approach of requirements definition and specification formulation of software products. The attendees also acquire practical knowledge of how to perform these activities in specific processes through reviewing example cases and workshops. ○The attendees learn, how to set numerical targets of HCD (Human-centered Design), how to verify the numerical targets, how to assessment verification result, and how to incorporate the assessment results to product specifications. ○Explanations of laws to be conformed and necessary technology important for accessibility of software products are provided. ○The attendees learn an overview of HCD in one-lecture day, its example cases in 0.5-lecture day, and its practical knowledge in 0.5-workshop day.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as leaders or members of software product development teams (those who aim to acquire knowledge of Software Development level 4 or 5).
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture, Workshop
Duration	Standard term: 2 days (classroom)
Learning Goal	Can apply human-centered design methods to a software product as a member of a software product development team by utilizing practical knowledge of requirements definition and specification formulation.

Skill Items	Knowledge Items
Software Engineering	-Technology Verification Methods Prototyping, Simulation, Modeling
Development Methods Design	-Quality Inspection (Software Development) Design Review, Code Review, Function Test, Integration Test, Performance Test, Durability Test, Usability Test
Analysis and Requirements Definition	-Human-centered Design -Accessibility (Software Development) Accessibility Function of Various Systems, Country Specific Guidelines and Regulations

Leadership Skills Required in Software Development (1 course)

●Leadership Skills Required in Software Development

Course Name / Content	Leadership Skills Required in Software Development
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees acquire practical skills of the following that are required of members of software product development teams and success factors of any projects: object setting, team building, communication with people within and outside teams, creation of project action items, promotion of the project action items, management of the project action items, and skills for motivating team members. ○The attendees learn, in workshops including role-play, the following items required to promote medium-sized, large-sized, or complex projects: leadership, self motivation, motivating team members through team building, interpersonal skills, discord management, and consensus building.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as leaders or members of software product development teams (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Have completed Personal Skill Fundamentals, or possess equivalent knowledge.
Training Method	Workshop
Duration	Standard term: 3 days (classroom)
Learning Goal	Can lead a software product development team to achievement of a goal as a person responsible for or a leader of the software product development team by taking leadership.

Skill Items	Knowledge Items
Leadership	-Leadership Fundamentals and Principles of Leadership, Teamwork and Communication, Project Objective Setting, Project Promotion, Project Execution, Project Management, Collaboration Between Team Members, Motivating Team Members and Provision for Feelings of Accomplishment

Communication Skills Required in Software Development (1 course)

●Communication Skills Required in Software Development

Course Name / Content	Communication Skills Required in Software Development
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees acquire the following practical skills that are a success factor of any projects and are required of software product development team members: effective and efficient communication with people involved in projects ○The attendees learn, in workshops including role-play, the following important for promotion of medium-sized, large-sized, or complex projects: two-way communication, passing of information, and processing of information.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as leaders or members of software product development teams (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Have completed Personal Skill Fundamentals course group, or possess equivalent knowledge.
Training Method	Workshop
Duration	Standard term: 3 days (classroom)
Learning Goal	Can promote effective and efficient interaction with project members and a decision-related key person on customer side, and communicate with a stakeholder as a person responsible for or a leader of a software product development team.

Skill Items	Knowledge Items
Communication	-2-Way Communication Dialogue and Interview, Information Transfer, Communication Technique, Effective Speaking and Listening -Transmission of Information Presentation Technique, Creation of Official and Nonofficial Documents, Technical Writing, Media Selection, Persuasion Technique -Organization, Analysis and Retrieval of Information Development and Practice of Status Response Capabilities to Understand Situations, Capabilities to Understand Situations, Meeting Management Techniques

Negotiation Skills Required in Software Development (1 course)

●Negotiation Skills Required in Software Development

Course Name / Content	Negotiation Skills Required in Software Development
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees acquire practical negotiation skills important for any situations or scenes in projects. ○About negotiation with people concerned with any scenes or situations in medium-sized, large-sized, or complex projects, the attendees learn and perform role-play in workshops in how to divide negotiation phases into several phases, how to understand expected problems, how to formulate problem solving solutions with negotiating partners.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as leaders or members of software product development teams (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Have completed Personal Skill Fundamentals, or possess equivalent knowledge.
Training Method	Workshop
Duration	Standard term: 3 days (classroom)
Learning Goal	Can resolve collision and conflicts with negotiating partners and build consensus with a stakeholder or members of software development team as a person responsible for or a leader of the software development team.

Skill Items	Knowledge Items
Negotiation	-Negotiation Negotiation Process, Effective Negotiation Techniques, Establishment of Trust Relationship, Objective Setting, Common Interest, Logical Thinking, Problem Solving Techniques

Latest Technology Trends (1 course)

●Latest Technology Trends

Course Name / Content	Latest Technology Trends
Training Course Level	☐Introductory Course ☐Basic Course ☐Advanced Course ■Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees learn the latest technology trends surrounding IT services changing from day to day and acquire knowledge of how to apply the latest technology trends to actual business. ○The attendees learn sizes and trends of IT markets in domestic and abroad IT markets d, present and future IT, component technology trends of the following (advanced technology, international standards, platforms, system management infrastructure, databases, networks, distributed computing systems, and security), application technology trends, business model patent technology trends, next-generation e-business, and its future growth. ○Training contents are provided on given themes according to need, and the attendees select a theme to take part in a lecture for maintaining or improving their skills at regular intervals or when needed.
Attendee	Those who should keep up with their different kinds of technology knowledge as persons responsible for, leaders of, or members of software product development teams (those who aim to acquire the knowledge of Software Development level 4, 5, or 6)
Precondition	Possess fundamental knowledge of IT, have experience of project management, and have results of the project management.
Training Method	Lecture
Duration	Standard term: 1 day (classroom)
Learning Goal	Can apply knowledge of the latest technology to an actual project effectively based on understanding of the latest technology.

Skill Items	Knowledge Items
Technology	-Technology Trends Understanding of Latest Hardware Technology Trends, Understanding of Latest Middleware Technology Trends, Understanding of Latest Platform Technology Trends, Understanding of Latest Network Technology Trends, Understanding of Latest Database Technology Trends, Understanding of Latest Security Technology Trends, Understanding of Latest System Management Technology Trends -Parallel Processing Programming Techniques -Web Application Technologies HTML, Servlet, EJB and J2EE, JSP and JSF, Various Markup Languages based on XML and XML, Web Services (SOA, SOAP, WSDL, UDDI, WS-Security, etc.)
Analysis and Requirements Definition	Understanding of Market Trends and Competitive Trends Information Collection, Information Analysis, Understanding of Market Trends -Industry and Technology Trends International Standards, De facto Standards, High-Technology, Remarkable Technology

Latest Business Trends (1 course)

●Latest Business Trends

Course Name / Content	Latest Business Trends
Training Course Level	☐Introductory Course ☐Basic Course ☐Advanced Course ■Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees acquire knowledge of the latest business trends changing from day to day. ○Training contents are provided on given themes (e.g., management issues of major industries, the latest trends of the major industries, topics, IT market trends in a domestic country and abroad, m and major technology trends) according to need, and the attendees select a theme to take part in a lecture (or e-learning type methods) for maintaining or improving their skills at regular intervals or when needed.
Attendee	Those who should keep up with their business trend knowledge in order to understand business environment of customers relevant to projects as persons responsible for, leaders of, or members of projects (those who aim to acquire the knowledge of Software Development level 4, 5, or 6)
Precondition	Have completed Industry Business Operations Knowledge Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture or E-learning
Duration	Standard term: 0.5 day (classroom) or Standard term: 3 hours (e-learning 6 hours/day x 0.5 day)
Learning Goal	Can comprehend business issues of a stakeholder precisely and apply knowledge of short- and medium- term business trends surrounding a customer to customer's business effectively based on understanding of and by utilizing the knowledge.

Skill Items	Knowledge Items
Analysis and Requirements Definition	-Understanding of Market Trends and Competitive Trends Information Collection, Information Analysis, Understanding of Market Trends -Industry and Technology Trends International Standards, De facto Standards, High-Technology, Remarkable Technology -Knowledge of Relevant Laws and Regulations Understanding and Compliance of Relevant Regulations

Community Activities (1 course)

●Community Activities

Course Name / Content	Community Activities
Training Course Level	☐Introductory Course ☐Basic Course ☐Advanced Course ■Special Course
Training Area (Common or Specialty Field)	■Common to Software Development ☐Operating System ☐Middleware ☐Application Software
Outline	Aim: Community activities, unlike trainings, give IT professionals opportunities to learn from one other and contribute to development of subordinates. Community activities are all sorts of activities within or outside companies regardless of any types of organizations. Community activities outside companies are activities in academic conferences or various associations (including voluntary ones), and community activities within companies are, for instance, activities by those certified by certification system in their companies. ○Individuals with high-level skills are considered out of learning through trainings, and they are expected to improve their skills by exchanging information and discussing with other individuals in community activities. ○The individuals contribute to through development of subordinates through writing a paper and giving lectures based on their high-level knowledge and skills. Especially in community activities within companies, they lead activities for design, institution, and implementation of personnel system, education system, and training system. They make contribution as IT professionals in business fields to pursuit of human resource development strategies related to business strategies as well. ○Regarding product development, it is often important for the professionals to participate in relevant standards organizations and to incorporate own product technology into the standards.
Attendee	- -
Precondition	- -
Training Method	- -
Duration	- -
Learning Goal	- -

Software Development

Training Course Description

<Specific to Each Specialty Field (Selective Courses)>

Component Technology (3 courses)

[ ] is a corresponding specialty field

- Operating System Component Technology [Operating System]
- Workshops on Device Driver Development [Operating System]
- Middleware Component Technology [Middleware]

Course Name / Content	Operating System Component Technology
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ■Operating System ☐Middleware ☐Application Software
Outline	Aim: This is one of the courses in Component Technology course group, which is the subsequent of System Development Fundamentals course group. Attendees acquire knowledge of architecture that determines performance of products that are platform components, and component technology that are implemented in products. ○The attendees learn hardware (e.g., TRON, Symbian, and PIC (Programmable Interface Controller)) for embedded systems, operating systems, and development environment of the operating systems.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development (specialty field: Operating System) level 3)
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture, Workshop
Duration	Standard term: 5 days (classroom)
Learning Goal	Can select application technology and solve technical problems on the basis of technology trends relevant to an area that you are associated with as a member of software product development team by utilizing knowledge of hardware architecture and operating system implementation.

Skill Items	Knowledge Items
Technology	-Technology Trends Understanding of Latest Hardware Technology Trends, Understanding of Latest Middleware Technology Trends, Understanding of Latest Platform Technology Trends, Understanding of Latest Network Technology Trends, Understanding of Latest Database Technology Trends, Understanding of Latest Security Technology Trends, Understanding of Latest System Management Technology Trends −Understanding and Utilization of Computer System Architecture and Fundamental Technologies −Operating system Fundamentals Mainframe OS, Small Business Computer Proprietary OS, Unix, Windows, Linux, Embedded Device OS
Design	-Architecture Process Abstraction of Market Demand, Possibility of Advanced Technology, Possibility of Architecture (Flexibility, Expandability), Effectiveness of Technology Prototyping
Hardware Compatibility Design	-Understanding for Architecture of Applied Hardware

Course Name / Content	Workshops on Device Driver Development
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ■Operating System ☐Middleware ☐Application Software
Outline	Aim: Attendees understand configuration and functions of operating systems. In workshops on development of device drivers, the attendees also acquire practical skills important for development of operating systems. ○The attendees perform exercises in development of device drivers for major OSs (e.g., Windows and Linux), learn programming techniques relevant to low-level interfaces of operating systems, and acquire testing techniques and debug techniques. ○In one training day, the attendees learn in lectures an overview of device driver development and understand case guides of workshops. After the lectures, the attendees develop device drivers and do testing of the device drivers in workshops.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development (specialty field: Operating System) level 3)
Precondition	Possess introductory knowledge of programming techniques.
Training Method	Lecture, Workshop
Duration	Standard term: 5 days (classroom)
Learning Goal	Can develop a device driver, do testing, and solve technical problems as a member of a software product development team by utilizing practical knowledge of device driver development.

Skill Items	Knowledge Items
Software Engineering	-Program Implementation Coding, Understanding and Practice of Test Process and Procedure and Methods -Testing Techniques Test Case Design, Specification Determination, Test Environment Set-up, Management, Test Data Preparation, Test Tool Utilization -Internal Design Function Design, Interface Design, Internal Data Design, Identification and Role-definition of Subcomponents, Relationship Definition among Subcomponents, Creation of Internal Specification -Debugging Methods Utilization and Practice of Debugging Tools
Technology	−Understanding and Utilization of Computer System Architecture and Fundamental Technologies −Operating system Fundamentals OS Mainframe OS, Small Business Computer Proprietary OS, Unix, Windows, Linux, Embedded Device OS
Hardware Compatibility Design	-Understanding for Architecture of Applied Hardware

Course Name / Content	Middleware Component Technology
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ☐Operating System ■Middleware ☐Application Software
Outline	Aim: This is one of the courses in Component Technology course group, which is the subsequent of System Development Fundamentals course group. Attendees acquire knowledge of architecture that determines performance of products consisted of middleware components, and component technology that are implemented in products. ○The attendees learn major middleware products, major system software products, database products, system management products, the latest component technology (e.g., transaction processing, distributed processing, parallel processing, and messaging) implemented in system software or middleware.
Attendee	Those who have participated in product development projects of operating systems, middleware, or application software as members of software product development teams (those who aim to acquire the knowledge of Software Development (specialty field: Operating System) level 3)
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture
Duration	Standard term: 5 days (classroom)
Learning Goal	Can select application technology and solve technical problems on the basis of the latest technology trends relevant to an area that you are associated with as a member of a middleware product development team by utilizing practical knowledge of middleware implementation.

Skill Items	Knowledge Items
Technology	-Technology Trends Understanding of Latest Hardware Technology Trends, Understanding of Latest Middleware Technology Trends, Understanding of Latest Platform Technology Trends, Understanding of Latest Network Technology Trends, Understanding of Latest Database Technology Trends, Understanding of Latest Security Technology Trends, Understanding of Latest System Management Technology Trends
Platform-Independent Design	-Understanding and Utilization for Architecture of Application Hardware and Related Operating System and Related Middleware

Industry Business Operations Knowledge Fundamentals (1 course)

[ ] is a corresponding specialty field

●Industry Business Operations Knowledge Fundamentals [Application Software]

Course Name / Content	Industry Business Operations Knowledge Fundamentals
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ☐Operating System ☐Middleware ■Application Software
Outline	Aim: Attendees acquire knowledge of current industries and their business operations and fundamental knowledge of applications currently used or considered to be used in the future. ○The attendees learn common business operations (e.g., sales, accounting, and human resource management) to many industries, specific business operations to each industry, and types of applications utilized in the specific business operations. Basic knowledge is a central aim, and only an overview of specific business operations in each industry is provided. To learn specialistic knowledge of specific business operations in each industry is necessary after learning basic knowledge of business operations through this course.
Attendee	Those who have participated in product development projects of application software as members of software product development teams (those who aim to acquire the knowledge of Software Development (specialty field: Application Software) level 3)
Precondition	Have completed IT Fundamentals 1 course group and IT Fundamentals 2 course group, or possess equivalent knowledge.
Training Method	E-learning
Duration	Standard term: 12 hours (e-learning 6 hours/day x 2 days)
Learning Goal	Can develop application software product with understanding of customer's business operations, the effectiveness and outcomes of the information system a s a member of an application software product development team by utilizing knowledge of industry specific issues, genera business operations and application systems.

Skill Items	Knowledge Items
Analysis and Requirements Definition	-Understanding of Market Trends and Competitive Trends Information Collection, Information Analysis, Understanding of Market Trends -Formulation of Software Product Strategy Customer Segment Analysis, Demand Analysis, SWOT Analysis, Formulation of Software Product Strategy, Understanding of Own Company Strategy
Business Application Design	-Understanding and Utilization for Architecture of Application Hardware and Related Operating System and Related Middleware

Industry Application Trends (1 course)

[ ] is a corresponding specialty field

●Industry Application Trends [Application Software]

Course Name / Content	Industry Application Trends
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ☐Operating System ☐Middleware ■Application Software
Outline	Aim: Attendees learn the latest trends in each industry and acquire knowledge of applications and solutions in the spotlight in order to keep updating knowledge of industry applications changing from day to day ○Training contents are provided on a given theme of each industry, application, or solution, and the attendees select a theme and take part in a lecture for maintaining or improving their skills at regular intervals or when needed. ○To provide lectures via e-learning type methods is possible; however, to give demonstrations of how applications work at lectures is recommended.
Attendee	Those who have participated in product development projects of application software as members of software product development teams (those who aim to acquire the knowledge of Software Development (specialty field: Application Software) level 3)
Precondition	Have completed Industry Business Operations Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture or E-learning
Duration	Standard term: 2 days (classroom) or Standard term: 12 hours (e-learning 6 hours/day x 2 days)
Learning Goal	Can apply the knowledge to an actual project effectively based on understanding of knowledge of necessary industries, new patterns of information systems, and trends of applications and solutions.

Skill Items	Knowledge Items
Analysis and Requirements Definition	-Understanding of Market Trends and Competitive Trends Information Collection, Information Analysis, Understanding of Market Trends -Formulation of Software Product Strategy Customer Segment Analysis, Demand Analysis, SWOT Analysis, Formulation of Software Product Strategy, Understanding of Own Company Strategy 向-Industry and Technology Trends International Standards, De facto Standards, High-Technology, Remarkable Technology
Business Application Design	-Understanding and Utilization of Application Software Knowledge -Understanding of Database, Middleware, and Distributed Computing Design Selection of Optimal Database and Middleware and Distributed Computing, Understanding for Function and Restrictions of Database and Middleware and Distributed and Computing, Practice of Application Design utilizing Database, and Middleware and Distributed Computing

Application Package Fundamentals (1 course)

[ ] is a corresponding specialty field

●Application Package Fundamentals [Application Software]

Course Name / Content	Application Package Fundamentals
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ☐Operating System ☐Middleware ■Application Software
Outline	Aim: This is the subsequent course of System Development Fundamentals course group. Attendees acquire knowledge of application packages and fundamental knowledge of various technology and concepts implemented in the application packages, both of which are important for development of application systems by utilizing application packages. ○The attendees learn application packages utilized currently in various industries, concepts, principles, mechanisms, and configurations implemented in the application packages, advantages and disadvantages of the application packages, how to use the application packages, implementation scope of the application packages, and considerations on usage of the application packages. ○Training contents are provided on a field, product, or theme, and the attendees select the field, product, or theme according to need. ○Because technology and products of application packages become obsolete due to upgrading or new software, to keep their application packages knowledge updated after taking this course is necessary. ○To provide lectures via e-learning type methods is possible; however, to give a demonstration of how application packages work at a lecture is recommended.
Attendee	Those who have participated in product development projects of application software as members of software product development teams (those who aim to acquire the knowledge of Software Development (specialty field: Application Software) level 3)
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture, Workshop, or E-learning
Duration	Standard term: 3 days (classroom) or Standard term: 18 hours (e-learning 6 hours/day x 3 days)

Course Name / Content	Application Package Fundamentals
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ☐Operating System ☐Middleware ■Application Software
Learning Goal	In development of an application system by utilizing an application package, can apply knowledge of advantages and disadvantages of technology implemented in an application package to development of a new application package as a member of an application software product development team based on understanding of the advantages and disadvantages.

Skill Items	Knowledge Items
Software Engineering	-Development Methods Development Methods Selection, Utilization and Practice of Development Techniques, Waterfall Model and RAD (Rapid Application Development) Model and Spiral Model, Application Package Specific Development Techniques
Analysis and Requirements Definition	-Understanding of Market Trends and Competitive Trends Information Collection, Information Analysis, Understanding of Market Trends
Business Application Design	-Understanding and Utilization for Architecture of Application Hardware and Related Operating System and Related Middleware -Understanding of Database, Middleware, and Distributed Computing Design Selection of Optimal Database and Middleware and Distributed Computing, Understanding for Function and Restrictions of Database and Middleware and Distributed and Computing, Practice of Application Design utilizing Database, and Middleware and Distributed Computing

Component Technology - Advanced Level - (4 courses)

[ ] is a corresponding specialty field

- Operating System Component Technology - Advanced Level - [Operating System]
- Middleware Component Technology - Advanced Level - [Middleware]
- Application Package Installation (Each Product) [Application Software]
- Security Design - Advanced Level - [Middleware / Application Software]

Course Name / Content	Operating System Component Technology - Advanced Level -
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ■Operating System ☐Middleware ☐Application Software
Outline	Aim: This course helps attendees acquire practical knowledge of technology, principles, and functions of operating systems. ○In addition to principles and functions of operating systems to be developed and external interfaces such as services and API, attendees learn internal configuration, data flows, and details of internal interfaces, and acquire knowledge and techniques necessary for expanding existing functions and designing and developing new functions. ○It is assumed that trainings related to internal specifications of specific products are held by and within attendees' companies.
Attendee	Those who have participated in product development projects of operating systems as leaders or members of software product development teams (those who aim to acquire the knowledge of Software Development level 4 or 5)
Precondition	Have completed Component Technology Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture
Duration	Standard term: 5 days (classroom)
Learning Goal	Can design and implement an operating system product as a person responsible for or a leader of an operating system development team by utilizing practical knowledge of design and implementation of operating system products.

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Skill Items	Knowledge Items
Technology	-Technology Trends Understanding of Latest Hardware Technology Trends, Understanding of Latest Middleware Technology Trends, Understanding of Latest Platform Technology Trends, Understanding of Latest Network Technology Trends, Understanding of Latest Database Technology Trends, Understanding of Latest Security Technology Trends, Understanding of Latest System Management Technology Trends -Parallel Processing Programming Techniques -Understanding and Utilization of Computer System Architecture and Fundamental Technologies
Design	-Architecture Process Abstraction of Market Demand, Possibility of Advanced Technology, Possibility of Architecture (Flexibility, Expandability), Effectiveness of Technology Prototyping
Hardware Compatibility Design	-Understanding for Architecture of Applied Hardware

Course Name / Content	Middleware Component Technology - Advanced Level -
Training Course Level	☐Introductory Course ■Basic Course ☐Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ☐Operating System ■Middleware ☐Application Software
Outline	Aim: This course helps attendees acquire practical knowledge of technology, principles, and functions of middleware. ○In addition to principles and functions of middleware to be developed and external interfaces such as services and API, attendees learn internal configuration, data flows, and details of internal interfaces, and acquire knowledge and techniques necessary for expanding existing functions and designing and developing new functions. ○The attendees take a look at external environment that can be a factor of middleware change, especially the latest information in Web application technology. ○It is assumed that trainings related to internal specifications of specific products are held by and within attendees' companies.
Attendee	Those who have participated in product development projects of middleware as leaders or members of software product development teams (those who aim to acquire the knowledge of Software Development (specialty field: Middleware) level 4 or 5)
Precondition	Have completed Component Technology Fundamentals course group, or possess equivalent knowledge.
Training Method	Lecture
Duration	Standard term: 3 days (classroom)
Learning Goal	Can apply high-level and practical middleware knowledge to design and implementation of a middleware product as a person responsible for or a leader of a middleware development team.

Skill Items	Knowledge Items
Technology	-Technology Trends Understanding of Latest Hardware Technology Trends, Understanding of Latest Middleware Technology Trends, Understanding of Latest Platform Technology Trends, Understanding of Latest Network Technology Trends, Understanding of Latest Database Technology Trends, Understanding of Latest Security Technology Trends, Understanding of Latest System Management Technology Trends -Parallel Processing Programming Techniques -Middleware Technique Understanding and Utilization for Structure of Web and CGI and JSP and EJB -Web Application Technologies HTML, Servlet, EJB and J2EE, JSP and JSF, Various Markup Languages based on XML and XML, Web Services (SOA, SOAP, WSDL, UDDI, WS-Security, etc.)
Design	-Architecture Process Abstraction of Market Demand, Possibility of Advanced Technology, Possibility of Architecture (Flexibility,, Expandability), Effectiveness of Technology Prototyping
Analysis and Requirements Definition	-Understanding of Market Trends and Competitive Trends International Standards, De facto Standards, High-Technology, Remarkable Technology
Platform-Independent Design	-Understanding and Utilization for Architecture of Application Hardware and Related Operating System and Related Middleware

Course Name / Content	Application Package Installation (Each Product)
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ☐Operating System ☐Middleware ■Application Software
Outline	Aim: This is a high-level course of application software component technology. Attendees acquire product specific knowledge for design, construction, and installation of application systems by participating in training of providers of application packages such as ERP, SCM, or CRM. ○The attendees learn the following specific to the products of the application packages by utilizing major application packages: methodologies, development languages, various tools, API, and performance tuning methods. ○Training methods in this course are vary from training service to training service, but generally training contents are provided in both lectures and exercises. The training contents also differ according to products, and the attendees select a proper training service as necessary.
Attendee	Those who have participated in product development projects of application software as leaders or members of software product development teams (those who aim to acquire the knowledge of Software Development (specialty field: Application Software) level 4 or 5)
Precondition	Have completed Component Technology Fundamentals course group and Application Package Fundamentals course group, or possess equivalent knowledge.
Training Method	Based on training contents prepared by manufactures or companies of application packages
Duration	Based on training contents prepared by manufactures or companies of application packages
Learning Goal	Can design and implement application software in a development project which utilize the application package as a person responsible for or a leader of an application software product development team by utilizing knowledge specific to a product of an application package.

Skill Items	Knowledge Items
Analysis and Requirements Definition	-Understanding of Market Trends and Competitive Trends Information Collection, Information Analysis, Understanding of Market Trends
Business Application Design	Understanding and Utilization for Architecture of Application Hardware and Related Operating System and Related Middleware -Understanding of Database, Middleware, and Distributed Computing Design Selection of Optimal Database and Middleware and Distributed Computing, Understanding for Function and Restrictions of Database and Middleware and Distributed and Computing, Practice of Application Design utilizing Database, and Middleware and Distributed Computing

Course Name / Content	Security Design - Advanced Level -
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ☐Operating System ■Middleware ☐Application Software
Outline	Aim: This course helps attendees acquire knowledge and skills necessary for formulating and promoting security policies and concepts required of software products through reviewing example cases. ○Through lectures and workshops, attendees deepen their knowledge of situations requiring tight security and considerations on complicated system integration or special environment in security design, and acquire practical knowledge of how to adopt measures for security Example cases this course covers can be: -Information systems that involve high risks of threats from outside through the Internet access -Information systems that require complicate and high-level access control -Information systems that require complicate and high-level physical security -Information systems that require high-level privacy management -Information systems that require high-level confidentiality -Information systems whose security vulnerabilities cause heavy losses to companies -Information systems that require high-level design for configuration change, maintenance and failure recovery for continuous operations
Attendee	Those who have participated in projects as leaders or members of development or technical teams of security software products (those who aim to acquire the knowledge of Software Development (specialty field: Middleware or Application Software) level 4 or 5).
Precondition	Have completed Security Component Technology course, or possess equivalent knowledge.
Training Method	E-learning, Lecture
Duration	[First Half] Standard term: 30 hours (e-learning 6 hours/day x 5 days) [Second Half] Standard term: 5 days (classroom)

Course Name / Content	Security Design - Advanced Level -
Training Course Level	☐Introductory Course ☐Basic Course ■Advanced Course ☐Special Course
Training Area (Common or Specialty Field)	☐Common to Software Development ☐Operating System ■Middleware ☐Application Software
Learning Goal	Can design and implement security functions as a person responsible for or a leader of a software product development team by utilizing broad and practical security knowledge.

Skill Items	Knowledge Items
Software Engineering	-Implementation and Inspection of Security Systems Selection and Installation of Security Products and Tools, Security System Development, Security Techniques Implementation -Security and Privacy Security Measures (Secret Preservation, Measures for Prevention of Falsification, Intrusion Prevention, Computer Virus, Integrity Measures, Availability Measures, Safety Measures, Social Engineering), Privacy Protection, Risk Management, Guidelines and Relevant Regulations