

# **Skill Standards for IT Professionals, Version 3 2008**

## **Part 3: Skills**

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**Ministry of Economy, Trade and Industry**

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## Introduction

Part 3: Skill describes skills from the following perspectives: *skill dictionary*, which covers all skill items and all knowledge items for each job career and all specialty fields for each job career; *skill area*, which is organized by skill structure and knowledge structure for each career; *skill proficiency*, which is organized by skill items and proficiency level on each level for the career; and *training roadmap*, which illustrates the training subject that should be learned corresponding to the skill standards for each career.

This part organizes the capabilities necessary in order to achieve the business experience and performance described in the KPI. Those are the indexes utilized while designing education and training.

Figure 1 is the total constitution of Part 3: Skills.

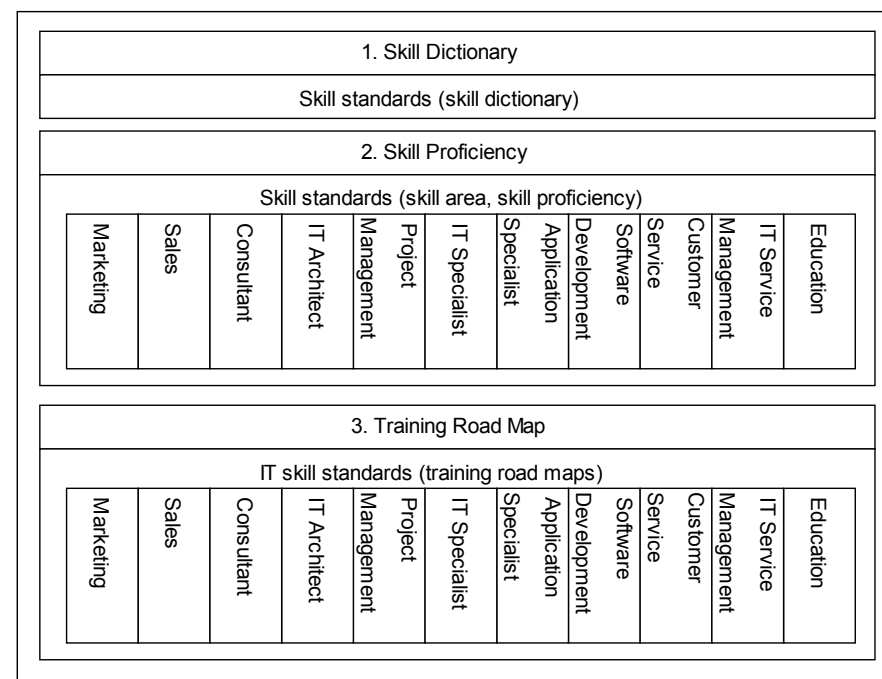


Figure 1. Total constitution of Part 3: Career

### ●Revision history

- 1 April, 2006, First version
- 7 July, 2006, The Education and Training Roadmap V2 released
- 31 October, 2006 V2 2006 released
- 31 March, 2008 V3 released

## 1. Skill Dictionary

### 1.1 Skill Dictionary

#### (1) Skill Dictionary

The skill dictionary covers and organizes all skill items and knowledge items that are defined in the skill standards. Skill items and knowledge items are organized into a hierarchy and show the corresponding job career and specialty fields in catalogue style.

Furthermore, the skill dictionary changes the color for every career, which improves visibility.

#### [Description Style]

- Job Category: Shows all the job category commonalities or each job category name
- Skill category: Shows the skill classification based on the characteristics, Technology, methodology, project management, business/industry and personal.
- Skill item: Shows the skill item. In addition, the separate column is used for the job category common skill items and specific specialty field skill items.
- Knowledge item: Shows the knowledge item for each skill item. Knowledge items are extended to two layers to describe the detail. Middle layer items (or middle items) are included in the skill description and skill proficiency, but lower layer items (or small items) are only

included in the skill dictionary.

- Specialty field: The corresponding skill item and the knowledge item for the category and specialty field is shown with the “X.”

Job Classification	Skill category	Skill Title		Knowledge item		Specialty Field													
		All careers common skill	Competency segment unique skill	Knowledge item (middle item)	Knowledge item (small item)	Marketing	Sales	Consultant	IT Architect	Project Management		IT Specialist							
						Marketing management	Sales communication	Consulting by selling knowledge	IT business trend analysis	System product development	Network service	System development	System management	Database	Network	IT related computing	Security	IT related computing	Security
Common to all job families	Project Management	Project Management		Develop Project Charter	Project selection methods Project management methodology PMS(Project Management Information System) Expert Judgment	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Common to all job families	Project Management	Project Management		Develop Preliminary Project Scope Statement	Project management methodology PMS(Project Management Information System) Expert Judgment	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Common to all job families	Project Management	Project Management		Develop Project Management Plan	Project management methodology PMS(Project Management Information System) Expert Judgment	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Common to all job families	Project Management	Project Management		Direct and Manage Project Execution	Project management methodology PMS(Project Management Information System) Expert Judgment	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Common to all job families	Project Management	Project Management		Monitor and Control Project Work	Project management methodology PMS(Project Management Information System) EVT(Earned Value Technique) Expert Judgment	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Figure 2. Example of Skill Dictionary

#### (2) Skill Dictionary (The corresponding table)<sup>1</sup>

Skill Dictionary has listed Skill and Knowledge items defined in ITSS, corresponding to those items in ITEE.

Important skills and knowledge for IT professionals are marked by using “X”, even if that skills and knowledge are not belonged to the specialty in the job category.

<sup>1</sup> Skill Dictionary: the table showing the correspondence between ITSS skills and ITEE skills

he columns of the corresponding skill and knowledge items in ITEE are shown with colors of job categories of ITSS.

In addition, based on future review of those items of ITEE, the Skill Dictionary of ITSS should be revised.

No.	ITEE		Marketing Market communication	Sales Visit type product sales Media use type sales	Project Management System development Software development Platform	Specialty Field				Application Specialist Operating system	Software development Application software Mobile software	Customer service Software Hardware	IT Service Management Facility management	IT Service Management System management Operation	Level 1 and common items Service desk	
	Large classification	Small classification				IT Specialist System Management Database Network Common Application infrastructure	Application Specialist Operating system	Software development Application software Mobile software	Customer service Software Hardware							IT Service Management Facility management
1-1	Basic theory	Discrete mathematics	X	X	X	X	X									
1-2		Applied mathematics	X	X	X	X	X	X	X	X						
1-3		Theory for information	X	X	X	X	X	X	X	X						
1-4		Theory for communication	X	X	X	X	X				X	X	X	X	X	
1-5		Theory for Measuring and control	X	X	X	X	X	X	X	X	X	X	X	X	X	
2-1	Algorithm and programming	Data structure	X	X	X	X	X									
2-2		Algorithm	X	X	X	X	X									
2-3		Programming	X	X	X	X	X					X	X	X	X	X
2-4		Programming language	X	X	X	X	X								X	X
2-5		Other IT languages	X	X	X	X	X								X	X
3-1	Computer components	Processor	X	X	X	X	X							X	X	X
3-2		Memory	X	X	X	X	X							X	X	X
3-3		Bus	X	X	X	X	X							X	X	X
3-4		Input and output device	X	X	X	X	X							X	X	X
3-5		Input and output unit	X	X	X	X	X							X	X	X
4-1	System components	System structure	X	X	X	X	X									
4-2		System evaluation index	X	X	X	X	X							X	X	X
5-1	Software	Operating system	X	X	X	X	X									
5-2		Middleware	X	X	X	X	X	X	X	X				X	X	X
5-3		File system	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5-4		Development tool	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5-5		Open source software	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6-1	Hardware	Hardware	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Figure 3. Example of Skill Dictionary (the corresponding table)

## 2. Skill Proficiency

“Skill item”, “knowledge item”, “skill proficiency”, and “skill area” are indexes defined in order to utilize business capabilities, which are necessary for the career and specialty field, in education and training.

### 2.1 Skill items, Knowledge items

The capability for business performance and experience defined in the KPI, is breakdown into elements, then rearranged by “Skill items”. “Knowledge items” indicate the knowledge that is utilized in each skill item.

Each skill item is classified into the following categories.

Skill category	Explanation
Technology	Technology skills necessary for successful job performance
Methodology	Skills such as methods, and problem-solving techniques needed for successful job performance
Business / Industry	Knowledge need-to-know for in the job career and specialty field. Industry specific phenomenon, industry trends, laws, codes, etc.
Project Management	Skill necessary for successful project performance
Personal skill	Personal skills needed for job performance

The skill standards does not include the following detailed descriptions from a

general perspective as a standard.

- Elemental technology regarding individual products or services that are necessary in the short term according to the project phase
- Industry application knowledge that differs in every industry, such as production or finance
- Individual motivation and traits, including social responsibility and ethics as a professional

These are what each company needs to select for assigned project, business strategy of employer, and the career path of individual imagined. In addition, specific skills, which are necessary for performing assigned jobs, are what an individual needs to voluntarily acquire as a professional.

### 2.2 Skill Proficiency

#### (1) Contents of Skill Proficiency

Skill proficiency systematically demonstrates the degree of proficiency and its corroborating knowledge, regarding the skill items necessary for experience and performance indicated in KPI (key business performance indicators).

For example, within the same knowledge item, the degree of understanding differs largely from the level of simply knowing a summary to the level of deep understand sufficient to write a paper. Skill proficiency is an index of clear degrees of proficiency. Figure 4 is an example of skill proficiency and knowledge items for Project Integration Management, which is a job career

common skill items in the project management career.

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Specialty Field: System development		Skill Proficiency/Knowledge Items of Project Management	
Skill Item and Knowledge Items		Skill Proficiency	
[Career common skill item] •Project Integration Management [Knowledge Items]  -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		Level 7	Able to perform the project successfully as a project manager in charge of the project with 500 persons or more during peak periods, or an annual contract value of 1 billion yen or more, by performing Project Integration Management such as Develop Preliminary Project Scope Statement, Develop Project Management Plan, Direct and Manage Project Work, Monitor and Control Project Work, Integrated Change Control, Close Project. In addition, able to present the related subjects at academic societies and symposia.
		Level 6	Able to perform the project successfully as a project manager in charge of the project from 50 but less than 500 persons during peak periods, or an annual contract value of 500 million yen or more, by performing Project Integration Management such as Develop Preliminary Project Scope Statement, Develop Project Management Plan, Direct and Manage Project Work, Monitor and Control Project Work, Integrated Change Control, Close Project.
		Level 5	Able to carry out the project as a project manager in charge of the project from 10 but less than 50 persons during peak periods, or an annual contract value of 100 million yen or more, by carrying out Project Integration Management such as Develop Preliminary Project Scope Statement, Develop Project Management Plan, Direct and Manage Project Work, Monitor and Control Project Work, Integrated Change Control, Close Project.
		Level 4	Able to carry out the project as a project manager in charge of the project with less than 10 persons during peak periods, or an annual contract value of less than 100 million yen, by carrying out Project Integration Management such as Develop Preliminary Project Scope Statement, Develop Project Management Plan, Direct and Manage Project Work, Monitor and Control Project Work, Integrated Change Control, Close Project.
		Level 3	

Skill Area and Skill Proficiency

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Figure 4. Example of Skill Proficiency/Knowledge Items (Project Management)

## (2) Description Style of Skill Proficiency

Skill proficiency consists of skill items, knowledge items, and criteria for proficiency. It represents the level of each skill item possessed by an individual, and it is defined in expressions of capability, such as “able to do ....”

[Description Style]

<Level 7,6,5,4 and 3>

Able to do <degree of action> as a <responsibility> with <quantitative and qualitative job condition> by performing <behavior content>

- Quantitative and qualitative job condition: Provides the quantitative and qualitative aspects of experience and performance. The details differ depending on the career, specialty, and level.
- Responsibility: The range of responsibility and authority.
- Behavior content: The contents of behavior for a skill item, regardless of levels.
- Degree of behavior: Describes the degree or a range of capability to perform behavior contents, such as “able to perform successfully”, “able to carry out”, and so on.

<Level 2 and Level 1>

Able to do <degree of application> as <a responsibility> with <contents> of skill and knowledge items

- Content: Level 2 - “Fundamental knowledge”,  
Level 1 - “Introductory-level knowledge”
- Degree of application: Level 2-Utilizes skills and knowledge, and perform assigned duties under the direction of higher-level professionals  
Level 1-Have skills and knowledge

For responsibility, the roles assumed in each level are provided as follows.

Level	Responsibility
Level 7	As a person responsible
Level 6	
Level 5	
Level 4	As a leader
Level 3	As a member
Level 2	
Level 1	

Skill proficiency describes the middle-layer items. Detailed knowledge items for the low-layer are described in the skill dictionary only.

## 2.3 Skill Area

The skill area rearranges the necessary skill items and knowledge items in each category and specialty field. Skill items are defined after dividing the category common skill items and specialty field specific skill items.

In lower levels (level 2, level 1), it is important to acquire skills and knowledge widely with a goal of high-level IT HR, and the range of ITEE is defined as the skill areas.

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Skill Area of Project Management		
Specialty Field	Skill Item	
Career common skill item	All Specialty Field	<ul style="list-style-type: none"> <li>• <b>Project Integration Management</b> <ul style="list-style-type: none"> <li>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</li> </ul> </li> <li>• <b>Project Scope Management</b> <ul style="list-style-type: none"> <li>Scope Planning, Scope Definition, WBS preparation, Scope Verification, Scope Control</li> </ul> </li> <li>• <b>Project Time Management</b> <ul style="list-style-type: none"> <li>Activity Definition, Activity Sequencing, Activity Resource Estimating, Activity Duration Estimating, Schedule Development, Schedule Control</li> </ul> </li> <li>• <b>Project Cost Management</b> <ul style="list-style-type: none"> <li>Cost Estimating, Cost Budgeting, Cost Control</li> </ul> </li> <li>• <b>Project Quality Management</b> <ul style="list-style-type: none"> <li>Quality Planning, QA (Perform Quality Assurance), QC (Perform Quality Control)</li> </ul> </li> <li>• <b>Project Human Resource Management</b> <ul style="list-style-type: none"> <li>Human Resource Planning, Acquire Project Team, Develop Project Team, Manage Project Team</li> </ul> </li> <li>• <b>Project Communications Management</b> <ul style="list-style-type: none"> <li>Communications Planning, Information Distribution, Performance Reporting, Manage Stakeholder</li> </ul> </li> <li>• <b>Project Risk Management</b> <ul style="list-style-type: none"> <li>Risk Management Planning, Risk Identification, Qualitative Risk Analysis, Quantitative Risk Analysis, Risk Response Planning, Risk Monitoring and Control</li> </ul> </li> <li>• <b>Project Procurement Management</b> <ul style="list-style-type: none"> <li>Plan Procurements and Acquisitions, Plan Contracting, Request Seller Responses, Select Sellers, Contract Administration, Contract Closeout</li> </ul> </li> <li>• <b>Analytical of Business applications</b> <ul style="list-style-type: none"> <li>Analytical of business application requirements, Analytical of technical requirements, Information management, etc.</li> </ul> </li> <li>• <b>Utilization of consulting techniques</b> <ul style="list-style-type: none"> <li>Selection and adaptation of consulting techniques</li> </ul> </li> <li>• <b>Knowledge management and utilization</b> <ul style="list-style-type: none"> <li>Management and utilization of intellectual properties</li> </ul> </li> <li>• <b>Leadership</b> <ul style="list-style-type: none"> <li>Leadership</li> </ul> </li> <li>• <b>Communication</b> <ul style="list-style-type: none"> <li>2-Way communication, Distribution of information, Organization and analytical and retrieval of information</li> </ul> </li> <li>• <b>Negotiation</b> <ul style="list-style-type: none"> <li>Negotiation</li> </ul> </li> </ul>
Specialty Field specific skill item	System development	<ul style="list-style-type: none"> <li>• <b>Management of IT solution design and development and Development management</b> <ul style="list-style-type: none"> <li>Software engineering, Requirements definition techniques, Techniques for solving technical problems, Latest technology trends, Latest IT market trends, Latest general-purpose application trends, Latest business application package trends, Implementation and inspection of security systems, etc.</li> </ul> </li> </ul>
	IT outsourcing	<ul style="list-style-type: none"> <li>• <b>Information System Management</b> <ul style="list-style-type: none"> <li>System management systems, Relationship management with a department of user services, Formulation of information systems planning, Formulation and implementation of system developments, Application to actual systems, Support for information services, Officing of information services, Information resources management, Requirements definition techniques, Techniques for solving technical problems, etc.</li> </ul> </li> </ul>
	Network services	<ul style="list-style-type: none"> <li>• <b>Designing Communication Environments and Management of Operation</b> <ul style="list-style-type: none"> <li>Grasp of communications industry trends, Utilization and practice of knowledge on network devices, Utilization and practice of network management technologies, Utilization and practice of knowledge on network protocols, Understanding and utilization of network technologies, Requirements definition techniques, etc.</li> </ul> </li> </ul>
	Software product development	<ul style="list-style-type: none"> <li>• <b>Development of New Software and Improvement of Existing Software</b> <ul style="list-style-type: none"> <li>Utilization and practice of software development techniques, Management of customer environments, Software product, Utilization and practice of knowledge on software products and package software, Software engineering, Requirements definition techniques, Management and utilization of intellectual properties, Techniques for solving technical problems, etc.</li> </ul> </li> </ul>

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Figure 5. Example of Skill Area (Project Management)

Important skills and knowledge for IT professionals are listed in the skill dictionary even if those skills and knowledge are not belonged to the specialty in the job category.

Among the job category common skill items, the skill items that are listed in the next table are defined commonly for all categories.



Skill Category	Skill Item	Knowledge items
Project Management	Project Management <sup>2</sup>	Project integration management Project scope management Project time management Project cost management Project quality management Project human resource management Project communication management Project risk management Project procurement management
Personal	Leadership	Leadership
	Communication	Two-way communication, transmission of information, organization, analysis, and retrieval of information
	Negotiation	Negotiation

required regardless of the level (for example, even in entry level).

However, even though the skill item names are same, these details, which are required in each job category, are not identical because of the difference in subjects, ranges, and responsibilities of exercising skill in performing the assigned duties. These skill items, which differ in every category, vary with the circumstances and environment. Therefore, the definition of each category simply describes the common level as the knowledge item.

The statement of the details differ depending upon the category even though the skill item names are the same and include the meaning that it is necessary for considering the skill contents, which are adjusted for their business. This is a point that should be considered during a skill appraisal.

The skill items common to all job categories are necessary skills as a base for business.

For example, it is common to work in the project form in the information service industry; therefore, basic knowledge about project management is

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<sup>2</sup> The description of Project Management is consistent with “A Guide To The Project Management Body Of Knowledge, Third Edition”.

### 3. The Education and Training Roadmap

#### 3.1 The Education and Training Roadmap

##### (1) The objective of Education and Training Roadmap

The Education and Training Roadmap should be used as a reference model to educate and train employees in the corporations that use the ITSS corresponding to Education and Training.

In order to increase the business capabilities as IT professionals, it is fundamental for individuals to accumulate their business experiences and obtain results being aware of the issues intentionally. On the other hand, it is also important to master prerequisite knowledge adequately in inexperienced fields. The Education and Training Roadmap is designed to help individuals acquire such knowledge.

##### (2) Points to remember

The Education and Training Roadmap design relies on IT service companies and industry professionals unlike the corporate curricula designed as in-house educational packages. This is based on the need for corporations to flexibly reflect practical business circumstances in educational packages. This, in turn, requires the company to create a blueprint of its educational needs—what technologies should be acquired by employees and how. Such an approach is useful for not only the corporate education program, but also

the objective understanding of the corporate technical strengths and weaknesses.

For IT service companies to increase their competitiveness in the industry, it is important to invest in the education of human resources in the same way that manufacturing companies invest in R&D and facilities. Such investments include a systematic educational system for their employees. However, most companies find it difficult to prepare complete education programs in-house. To ensure the quality of the educational program, it is effective for companies to cooperate with external educational institutions, private education providers, and industry associations.

#### 3.2 The Education and Training Roadmap Structure

##### (1) Course Groups (System chart)

The system chart shows the course groups to increase the business capabilities in their job categories or transfer to another category.

Figure 6 shows samples of Education and Training Roadmap for an IT specialist work category.

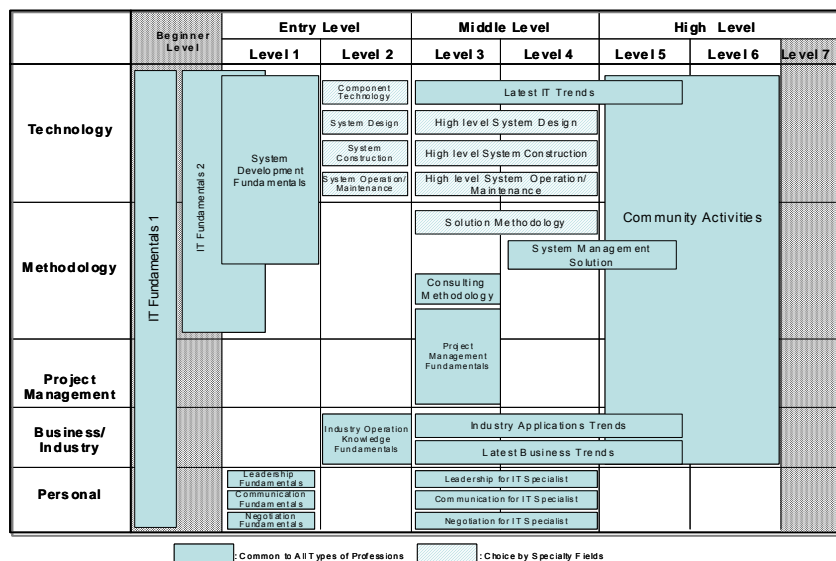


Figure 6. Example IT Specialist (Platform) Course Group

The horizontal direction of Course Groups shows the levels of trainees. Trainees plan to receive the course corresponding to current level of own.

Before the Entry level, “the Beginner Level” course is created for individuals who need to have education to entry for professionals in ITSS. The “Beginner Level” courses are designed to master the basics of IT for entry-level IT professionals (i.e., to have a job in the IT service industry).

The companies in IT industry hope the job applicants have basic IT skills and knowledge for IT professionals. However, the current situation in Japan is such that university graduates with insufficient knowledge of IT are being hired by companies. Companies must then bear the cost of additional

education. The fact that Beginner Level has been created reflects the need for this type of education at the university level, and is an implicit message from the industry to the educational community.

On the other hand, high-level knowledge is not teachable by lesson. The high-level professionals improve their business capability by the difficult and responsible tasks and community activity with other high-level professionals. The high-level professionals should participate in community activity to contribute to society and industry. The high-level professionals should develop subordinates also.

The vertical direction of Course Groups shows the five categories of technical contents: technology, methodology, project management, business /industry and personal. This is the same classification shown in the skill items.

Skill category	Explanation
Technology	Technical skills necessary for successful job performance
Methodology	Skills such as methods, and problem-solving techniques needed for successful job performance
Project Management	Skill necessary for successful project performance
Business / Industry	Knowledge need-to-know for in the job category and specialty field. Industry specific events industry trends, laws, codes, etc.
Personal	Personal skills needed for job performance

## (2) List of Education Courses

The list of the Education Courses shows the contents of each Education courses, delivery method and number of sessions or hours.

Category of Course Group	Course Group	Course Title	Delivery Method			Duration	
			e-learning	Lecture	Workshop	e-learning (One weekly 10hrs)	Lecture (One weekly 10hrs)
Common to All Types of Professions	Entry-Level Course	IT Fundamentals 1	X			60	
		Introduction to Personal Skills	X	X	X	12	3
	IT Fundamentals 2	IT Engineer Fundamentals	X		X	36	
		Programming Fundamentals	X	X	X	30	5
	Fundamental Course	Application Development Fundamentals	X			24	
		Database Fundamentals	X			12	
		Network Fundamentals	X			24	
		Security Fundamentals	X			18	
		Leadership Fundamentals	X	X		9	1
		Communication Fundamentals	X	X		9	1
		Negotiation Fundamentals	X	X		9	1
		System Design Fundamentals	X	X	X	30	5
		Main Application Design (Common to All Industries)	X			6	
		Main Application Design (Industry)	X			6	
		System Construction	X		X	60	5
		System Operation/Maintenance	X	X	X	30	5
		Industrial Operation Knowledge Fundamentals	X			12	
		Methods of Defining System Requirements	X		X	12	3
		Consulting Methodology	X		X	12	2
		Project Management Fundamentals	X			30	
	Advanced course	Leadership in Application Specialist			X		3
		Communication for Application Specialist			X		3
		Negotiation for Application Specialist			X		3
	Special Course	Latest IT Trends		X			1
		Industry Application Trends	X	X		12	2
		Latest Business Trends	X	X		3	0.5
		Community Activities	-	-	-	-	-
Choice by Area of Specialization	Fundamental Course	Component Technology Fundamentals	X			12	
		Component Technology for Platform	X			18	
	Advanced course	Component Technology for System Management Basis		X	X		5
		Component Technology for Database	X	X		18	3
		Component Technology for Network	X			12	
		Component Technology for Distributed Computing System	X	X		18	3
		Component Technology for Security	X	X		18	3
		Advanced Business Application System Design		X	X		5
		Advanced System Construction	X		X	30	5
		Advanced System Operation/Maintenance	X		X	60	5
		System Development Methodology	X		X	30	5
		Business Application System Development Methodology	X		X	30	5

Figure 7. Example Application Specialist (Operating Systems) Course

## Content

Applicable method for each Education Course is indicated by an “X”, and the average numbers of sessions or hours are provided as well.

## ■ E-learning

This delivery method enables students to acquire skills by using their own computers, without attending the class session. Instructional materials such as CD-ROMs and online training through ASPs (Application Service Providers) are available.

## ■ Lecture

This delivery method is a face-to-face method where one instructor teaches multiple students. In general, it takes the form of one-way communication where information is conveyed only in one direction—from the instructor to the student.

## ■ Workshop

In contrast to the lecture delivery method, this method is based on two-way communication—between the instructor and the student. Generally, the number of students participating in workshops is less than in lectures.

The duration shows normally required hours in e-learning and normally required days in class (lectures and workshops).

### (3) Education Course Description

Shown below is a list of the courses and their description. It shows the course outline, audience, prerequisites, educational objectives, etc.

Course Name	IT Architect Overview
<b>Content</b>	
<b>Training Course Level</b>	<input type="checkbox"/> Introductory Course <input checked="" type="checkbox"/> Basic Course <input type="checkbox"/> Advanced Course <input type="checkbox"/> Special Course
<b>Training Area (Common or Specialty Field)</b>	<input checked="" type="checkbox"/> Common to IT Architect <input type="checkbox"/> Application Architecture <input type="checkbox"/> Integration Architecture <input type="checkbox"/> Infrastructure Architecture
<b>Outline</b>	<p><b>Aim:</b> This is one of the courses in Architect Fundamentals course group. Attendees understand an overview of the job category IT Architect and skills required of IT Architect. The attendees also acquire fundamental knowledge important for design and development of IT architecture.</p> <p>◦The attendees learn a concept of architecture, an overview of the job category IT Architect, requirements and constraints important for selection and usage of architecture, characteristics of architecture functions, characteristics of system infrastructure, requirements which affect quality of architecture, and reuse.</p> <p>◦Via e-learning type methods in the first half, the attendees learn overviews of job contents of and important skills for the job category IT Architect, and fundamental knowledge of design and development of architecture in lectures in the second half.</p>
<b>Attendee</b>	Those who have participated in projects as leaders or members of technical teams and who aspire to lead system architecture in projects (those who aim to acquire the knowledge of IT Architect level 4 or 5)
<b>Precondition</b>	Possess fundamental knowledge of IT and system development and have participated in projects as members of technical teams.
<b>Training Method</b>	E-learning, Lecture
<b>Duration</b>	(First Half) Standard term: 6 hours (e-learning 6 hours/day x 1 day) (Second Half) Standard term: 3 days (classroom)
<b>Learning Goal</b>	Can design solution architecture which utilize knowledge of architecture design, architecture design techniques, architecture standardization, architecture reuse, and the latest architecture technology as a person responsible for or a leader of a technical team based on understanding of basic job contents, basic design, and basic framework of the job category IT Architect.

Figure 8. Example of IT Architect Course Content

#### ■ Classification of Course

The Education Courses have been classified into Entry-level courses, Fundamental courses, High-level courses and Special courses:

Entry-level courses	Beginner to Level 1
Fundamental courses	Level 1 to 3
High-level courses	Level 3 and above
Special courses	Courses for learning the latest trends in business and technology

#### ■ Target Specialty Field

The Education Courses have been divided into the courses for all IT professionals and the courses for specialists

#### ■ Overview

This item describes the objective of the training course and the highlights.

#### ■ Audience and Prerequisites

This item describes who can take the course and the prerequisite knowledge and experience required for enrollment.

#### ■ Delivery Methods and Duration

The shown reference samples help to design the education courses. The duration figure indicated here is a rough estimate. The combination of lectures and workshops is described as a classroom.

The Education and Training Roadmap shown in Figure 7 assumes that the IT service companies will provide education courses. E-learning is highly

recommended, because it enables busy professionals to obtain knowledge in their own pace in an efficient way. The lecture and the workshop delivery methods are also important in that they present content linked to practical business cases. In order to achieve highly efficient education, it is important that “who teaches what” and “how.” Therefore, high-level professionals’ contribution is essential.

#### ■ Educational Objectives

This figure shows the expected degree of accomplishment of students in business capability after the completion of their course.

Skill Items	Knowledge Items
Design of Architecture	<ul style="list-style-type: none"> <li>-Analysis and Definition of Requirements (Constraints)</li> <li>-Definition of IT Architecture Design Policy</li> <li>-Design of IT Architecture</li> <li>-Feasibility Assessment from the Viewpoints of IT Architecture and Technology</li> <li>-Definition of Technological Problems and Analysis of Alternatives</li> <li>-Assessment of Platform and Component Technology</li> </ul>
Design Techniques	<ul style="list-style-type: none"> <li>-Understanding of Modeling Techniques</li> <li>-Understanding and Application of Data Modeling Techniques</li> <li>-Understanding and Application of Process Modeling Techniques</li> <li>-Understanding and Application of Performance Modeling Techniques</li> <li>-Understanding and Utilization of Application Design Techniques</li> <li>-Understanding and Application of Infrastructure Design</li> </ul>

Figure 9. Example of IT Architect Course Content

#### ■ Target Skill Items/Related Knowledge

“Target Skill Items” and “Related Knowledge” in the education courses list the skills items and knowledge items of ITSS that most closely resemble the

skills required in the course. This list was created after a careful consideration of skills available in the IT services industry, such as those offered in ITEE and in the PMBOK (the Project Management Body of Knowledge) systems. Consistency its style has been maintained between the IT Skill Standards and the Education and Training Roadmap, and all essential content has been included.

#### (4) Matrix Chart of Knowledge Items and Education Courses

Shown below is a figure including a matrix of the knowledge items and courses. The Knowledge Items that should be mastered in each education course are marked with an “X”.

Application Specialist	Training Course Group									
	IT Fundamentals 1	IT Fundamentals 2	System Development Fundamentals	Leadership Fundamentals	Communication Fundamentals	System Design Fundamentals	System Design Fundamentals	System Design Fundamentals	System Design Fundamentals	System Design Fundamentals
Skill Item Common to All Types of Professions	Training Course									
Skill Item Peculiar to Area of Specialization	Item(s) of Knowledge									
Design										
Software Engineering										
Software Engineering										

Figure 10. Matrix Chart of Education Courses and Knowledge Items for Application Specialist (Partial)

Figure 10 can be used in two ways. One use is to place emphasis in the horizontal direction (education course groups and names). By placing emphasis on the education courses, the student can easily refer to the list of Knowledge Items contained in each education course, making it easier to confirm the Knowledge Items required when taking multiple education courses.

The second use is to place emphasis in the vertical direction. By placing emphasis on the Knowledge Items, students can easily understand the courses they must take.

### 3.3 Using the Education and Training Roadmap

#### (1) Transition within an Education Course

The course groups are mapped on the Education Roadmap. Course participants select a course corresponding to their current level. The course provides the necessary and sufficient condition knowledge items for the next level. For example in Figure 10, “System Development Fundamentals” is shown as an education course for level 1. A student may acquire the necessary knowledge of level 2 by taking this.

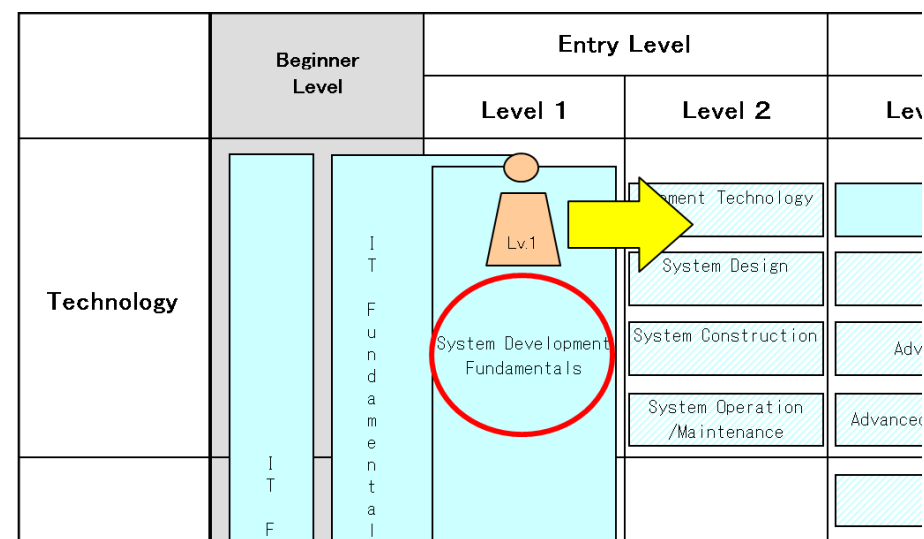


Figure 11. Example of a Transition

The level of course corresponds to the current level of an individual. Therefore, Beginner level is made before level 1. This level is for novice computer users such as students who have never worked in the IT service industry. For the same reason, lower level courses are made in some job categories. The lower level courses provide the knowledge for the lowest level defined in the ITSS. For example, in Project Management, level 2 is a preparation course for level 3.

For individuals who are seeking to move up to higher levels, it is recommended to have education course of the preceding level.

#### (2) Education Courses at multiple levels

There are also some courses in the Education Roadmap that are mapped at multiple levels. This has two implications.

First, it means that the course requires continuous learning. For example, if a course is mapped from level 3 through level 5, it shows that the course is not only for students at level 3, but also for those who have completed it and are now in levels 4 or 5. The courses that fall under this category are for students whose knowledge requires constant content updates in the latest industry and technology trends.

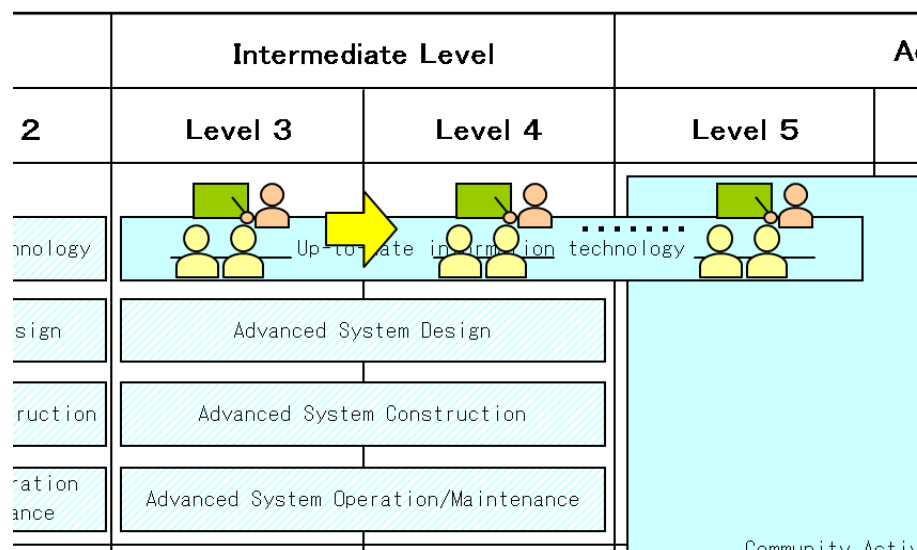


Figure 12. Example of courses that require continuous education  
(Latest trend of Information technology)

Second, it means that these courses are prerequisites for courses to reach a

target level. For example, if a course is mapped from level 4 to level 5, it implies that this course must be taken before taking a course at level 6. Many courses on fundamental knowledge and technology fall under this category.

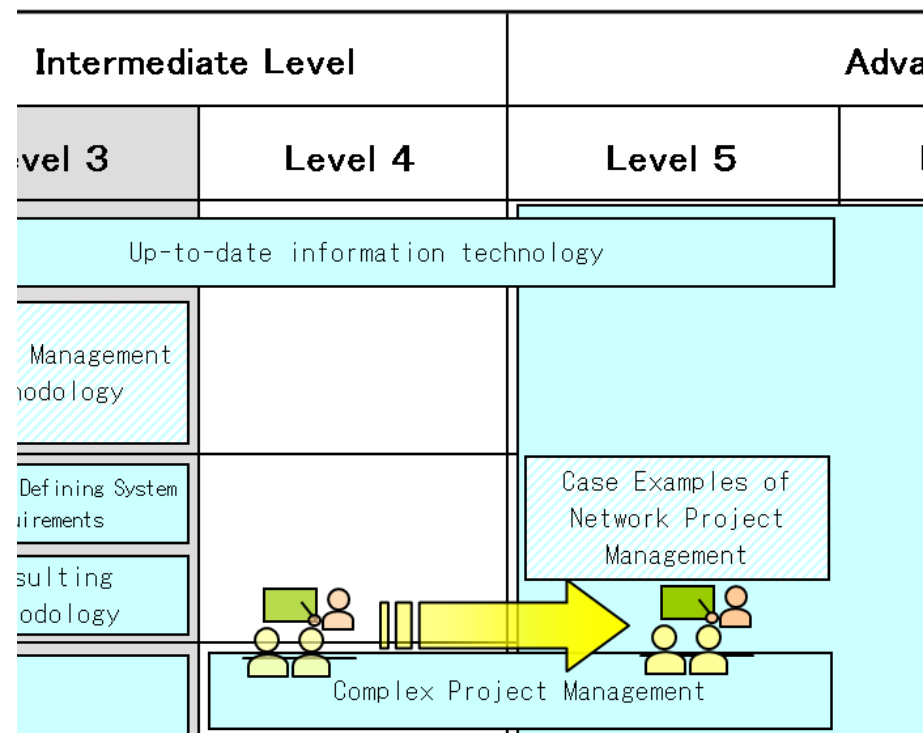


Figure 13. Example of courses to be taken to achieve a target level  
(Complex Project Management)

### (3) ITSS and Knowledge Items in the Education and Training Roadmap



The Education and Training Roadmap includes some Knowledge Items that are not described in the ITSS. Knowledge Items in ITSS are selected as required knowledge for the job category, but the Roadmap lists recommended knowledge.

#### (4) Project Management Fundamentals

One important point in the Education and Training Roadmap in ITSS is that Roadmaps of all job categories have “Project Management Fundamentals.” The assigned job for IT professional may be related to a project. Therefore all the IT professionals in every job category are recommended to have the fundamentals of project management. All the IT specialists are encouraged to use their specialty field skills with understanding of fundamentals of project management.

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