

ITSS Model Curriculum

- To get level 3 -

(Corresponding with ITSS V3)

IT Skill Standards Center

IT Human Resources Development Headquarters

Information-Technology Promotion Agency (IPA), JAPAN



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Introduction

Information-Technology Promotion Agency (IPA), Japan, has released a Common Career/Skills Framework for a purpose to establish an objective human skill assessment mechanism that is one of specific measures for advanced IT human resource development. In Skill Standards for IT Professionals V3 (ITSS V3), we clearly characterized an Information Technology Engineer Examination (ITEE) as an assessment tool of ITSS levels 1, 2, and 3. In this background, the IT Skill Standards Center (ITSS Center) received thousands of valuable requests from domestic and international ITSS users for organizing an ITSS model curriculum that is corresponding with the knowledge items of the Common Career/Skills Framework.

Supporting the users' needs, we have prepared a Training Road Map and ITSS Model Curriculum - To get level 3 -. The Training Road Map is a reference source of training courses when educational organizations, companies, etc. implement educational trainings. The ITSS Model Curriculum - To get level 3 - is the subsequent volume of model curricula; an ITSS Model Curriculum - To get level 1 - (released in June 2006) and ITSS Model Curriculum - To get level 2 - (released in August 2008), including a model curriculum to provide specific reference information when they design and implement educational trainings corresponding with ITSS.

This model curriculum collects all knowledge items of the Common Career/Skills Framework and helps attendees acquire common fundamental knowledge of all job categories required to get ITSS level 3. In addition to this model curriculum, it is recommended for attendees to take the training courses of the specialty fields that are specified in the Training Road Map and that the attendees aim to go into.

We hope this model curriculum will be exploited to develop human skills and promote systematic knowledge trainings.

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IT Skill Standards Center

IT Human Resources Development Headquarters

Information-Technology Promotion Agency, Japan (IPA)

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Chapter 1 Curriculum Overview

1. Background and outline

Information-Technology Promotion Agency (IPA), Japan, has released the Common Career/Skills Framework for the purpose to establish the objective human skill assessment mechanism that is one of the specific measures for the advanced IT human resource development. In Skill Standards for IT Professionals V3 (ITSS V3), we clearly characterized the Information Technology Engineer Examination (ITEE) as the assessment tool of ITSS levels 1, 2, and 3. In this background, the IT Skill Standards Center (ITSS Center) received the thousands of valuable requests from the domestic and international ITSS users for the ITSS model curriculum that is corresponding with the knowledge items of the Common Career/Skills Framework.

The ITSS Center has also released the Training Road Map and Model Curriculum. The Training Road Map is to be a reference source of training courses when educational organizations, companies, etc. implement educational trainings. The Model Curriculum is to provide specific reference information when they design and implement educational trainings corresponding with ITSS.

We have provided, for those who aim to get levels 1 or 2, the model curricula that are corresponding with the knowledge items of the Common Carrere/Skill Framework and cover the knowledge required of each level. We assume that those who aim to get levels 1 or 2 are workers involved in companies, other enterprises, etc., and students attending educational organizations such as graduate schools. Considering this, each training course consists of subjects and each subject consists of 15 units x 90 minutes for wide adaptability. The details of each unit are also described as well.

For those who aim to get level 3, we have prepared the model curriculum that collects all knowledge items of the Common Carrere/Skill Framework and helps attendees acquire the fundamental and common knowledge of all job categories required to get level 3. The definition of ITSS level 3 is to be able to perform business operations independently as a member of a project team, and it is based on an assumption that she/he is involved in business operations in a company. In addition, due to a presumption that trainings implemented by companies are usually intensive sessions, course details are described but there is no definition of subjects or units.

Attendees are supposed to have already acquired some of the skills and knowledge items including personal skills required of level 3 through ITSS Model Curriculum - To get level 2 -, so these skills and knowledge are not listed in this model curriculum.

2. Target and precondition

This model curriculum is for those who aim to acquire the knowledge of ITSS level 3.

The precondition of this model curriculum is that attendees have completed the training courses based on the ITSS Model Curriculum - To get level 2 - or possess equivalent knowledge.

3. Structure

3.1 Common Training Course Groups for level 3*

The figure below explains a Common Training Course Group for level 3 corresponding with this model curriculum.

Common Training Group for Level 3

	Level 2 (aim at Level 3)	
Technology	IT Essentials	
	System Development	
Methodology	System Operation / Maintenance	
Project Management		Project Management Fundamentals
Business/ Industry		Industry Business Operations Knowledge Fundamentals
Personal		

* Based on the "Common Training Course Groups", some modifications are made for level 3.

3.2 Subject overview

Here is shown the list of the training courses of this model curriculum .

Level	Course Group	Course Name	Course Name	Outline	Attendee / Precondition	Total Hour*
Level 2 (who aim to get level 3)	IT Essentials	C11	IT Essentials	This course is designed for attendees to acquire basic skills related to technology required to promote of business operations. In this course, attendees deepen the knowledge they gained through IT Fundamental 1 and IT Fundamental 2 and aim at reinforcing the knowledge related to IT technology.	Those who aim to acquire the knowledge of ITSS level 3 / Have completed IT Fundamentals 1 course group and IT Fundamentals 2 course group, or possess equivalent knowledge	30 hours
	Industry Business Operations Knowledge Fundamentals	C21	Industry Business Operations Knowledge Fundamentals	This course is designed for attendees to acquire knowledge related to current industries and their business operations, basic application knowledge that is currently used and considered to be used in the future. Attendees also learn common business operations (e.g., sales, accounting, human resource management,) performed in many industries, major industry specific business operations, and application types that are used in those common or major business operations. Acquiring basic knowledge of industry business operation is a focus in this course, and only the overview of the industry specific business operations is provided. Attendees should learn specific knowledge related to industry specific business operations after learning the basic knowledge through this course.	Those who aim to acquire the knowledge of ITSS level 3 / Have completed IT Fundamentals 1 course group and IT Fundamentals 2 and System Development Fundamentals course groups, or possess equivalent knowledge	12 hours
	System Development	C31	System Design Fundamentals	This course is designed for attendees to acquire basic knowledge of a broad area related to system design, such as methodologies, techniques, and design patterns that are necessary when designing general information systems regardless application types. Attendees also learn analysis techniques for operational requirements of information systems, important knowledge related to external and internal design, design techniques for user interfaces and system interfaces. Operations associated these techniques and knowledge, such as how to design process flow of information systems, charts and tools used when designing systems, are included in this course as well. In the first half, basic knowledge related to information system design is provided via e-learning. In the last half, in addition to lectures, virtual project of information system development are provided in order for attendees in workshops to learn design work in a practical manner.	Those who aim to acquire the knowledge of ITSS level 3 / Have completed System Development Fundamentals course group, or possess equivalent knowledge	30 hours + 5 days
		C32	System Architecture	This course is designed for attendees to acquire basic knowledge related to information system architecture. In this course, important programming languages in application architecture, major algorithm, how to assess validity of application tests and their results, installation and migration of information systems, and management skills of project progress are included. In the first half, in addition to writing practice for the major programming languages used for developing information systems and programming languages used for middleware, major algorithm, various tools used on programming, and status assessment techniques used for smooth project implementation can be provided via e-learning. In the last half, attendees learn in workshops how to develop systems by utilizing information system environment simulated of an actual one in a practical manner. It is recommended to provide attendees practice environment, which is similar to an actual system development environment, if the first half sessions are provided via e-learning.	Those who aim to acquire the knowledge of ITSS level 3 / Have completed System Development Fundamentals course group, or possess equivalent knowledge	60 hours + 5 days
	System Operation / Maintenance	C41	ITSM Fundamentals (I)	This course is designed for attendees to deepen their understanding of significance and purposes of service management and to acquire basic knowledge related to service management. For effective understanding of service management and its promotion, this course puts a focus on understanding of significance and purposes of service management and on learning knowledge related to service support.	Those who aim to acquire the knowledge of ITSS level 3 / Have completed IT Fundamentals 1 course group and IT Fundamentals 2 course group, or possess equivalent knowledge	12 hours
		C42	System Operation / Maintenance	This course is designed for attendees to acquire basic knowledge related to information system operation and maintenance. Attendees learn factors important for smooth information system operations such as management items, management techniques, and management standards. How to handle failures of operating systems and essential middleware components, information systems monitoring, system resource management, preventive measures against failures and recovery, and system maintenance are also included in this course. In the first half, the basic knowledge related to information system operation and maintenance is provided via e-learning. In the last half, in addition to the lectures, attendees learn, in workshops and in a practical manner, operation and maintenance of information systems by using development environment of information systems simulated of actual one prepared in the previous course.	Those who aim to acquire the knowledge of ITSS level 3 / Have completed System Development Fundamentals course group, or possess equivalent knowledge	30 hours + 5 days
		C43	Relevant Knowledge	This course is designed for attendees to acquire important knowledge related to laws, ethics, contracts, criteria and standards necessary for promoting business operations.	Those who aim to acquire the knowledge of ITSS level 3 / Have completed IT Fundamentals 1 course group and IT Fundamentals 2 course group, or possess equivalent knowledge	6 hours
	Project Management	C51	Project Management	This course is designed for attendees to acquire basic knowledge related to project management. Attendees learn, based on PMBOK, a concept of general project management which is regardless of characteristics of any industries or fields, and which include basic knowledge of overall project management (e.g., project definitions, organization, making plans, developing schedules, project implementation and management, project completion).	Those who aim to acquire the knowledge of ITSS level 3 / Possess basic knowledge of both IT and system development, and have experience of participation in projects such as system development or system operation management	30 hours

* When the "Total Hours" is on hour-basis, it means sessions can be provided by lecture (or e-learning), on day-basis by workshop (sessions based on two-way communications between a lecturer and attendees).

3.3 Subject order

There is no strict order of completion of training courses; however, it is recommended to take Project Management Fundamentals, after attendees complete other courses and gain work experience of system development and operation management.

3.4 Training based on ITSS by company or educational organization

In this model curriculum, each training course consists of sessions on 6-hour basis. When sessions are implemented intensively based on this model curriculum by companies, a 6-hour session can be held in a day. When educational organizations, such as the graduate schools, implement sessions based on this model curriculum, contents of each training course can be divided into units by following school hours. Workshops, however, are designed as intense classes and should not be divided into units.

4. Correspondence with Training Road Map

The Training Road Map shows training courses that attendees should complete according to job categories corresponding with ITSS. There are about 100 training courses defined (total hours: 2,000 hours) for those who aim to acquire the knowledge of each job category and specialty field of level 3.

This mode curriculum contains 8 training courses (total hours: 300 hours) that extract comprehensively the knowledge items of the Common Carrere/Skill Framework from the training courses mentioned above.

As mentioned earlier, ITSS level 3 expects an ability to be able to perform business operations independently. In addition to this model curriculum, it is recommended for attendees to take the training courses of the specialty fields that are specified in the Training Road Map and that the attendees aim to go into.

The diagram below shows the relationship between the 8 training courses and the Training Road Map. When attendees are planning to take a training course of a specialty field in the Training Road Map that they aim to go into, they can skip the training courses defined in this model curriculum.

Level	Model Curriculum			Training Road Map		
	Course Code	Common Training Group for Level 3	Course Name	Job Category	Training Course Group	Course Name
Level 2 (who aim to get level 3)	C11	IT Essentials	IT Essentials	IT Service Management	IT Essentials	IT Essentials
	C21	Industry Business Operations Knowledge Fundamentals	Industry Business Operations Knowledge Fundamentals	Application Specialist	Industry Business Operations Knowledge Fundamentals	Industry Business Operations Knowledge Fundamentals
	C31	System Development	System Design Fundamentals	Application Specialist	System Design	System Design Fundamentals
	C32		System Architecture	Application Specialist	System Architecture	System Architecture
	C41	System Operation / Maintenance	ITSM Fundamentals (I)	IT Service Management	ITSM Fundamentals	ITSM Fundamentals (I)
	C42		System Operation / Maintenance	Application Specialist	System Operation and Maintenance	System Operation / Maintenance
	C43		Relevant Knowledge	IT Service Management	ITSM Fundamentals	Relevant Knowledge
	C51	Project Management Fundamentals	Project Management Fundamentals	Project Management	Project Management Fundamentals	Project Management Fundamentals

Chapter 2 Subject Details

1.	Course corresponding with IT Essentials course group.....	C1-1
1.1	IT Essentials	C1-1
2.	Course corresponding with Industry Business Operations Knowledge Fundamentals course group.....	C2-1
2.1	Industry Business Operations Knowledge Fundamentals course.....	C2-1
3.	Course corresponding with System Development course group	C3-1
3.1	System Design Fundamentals course.....	C3-1
3.2	System Architecture course group	C3-7
4.	Course corresponding with System Operation / Maintenance course group	C4-1
4.1	ITSM Fundamentals (I) course.....	C4-1
4.2	System Operation / Maintenance course	C4-6
4.3	Relevant Knowledge course.....	C4-12
5.	Course corresponding with Project Management Fundamentals course group..	C5-1
5.1	Project Management Fundamentals course	C5-1

1. Course corresponding with IT Essentials course group

1.1 IT Essentials course

(1) Course details

Course Name	IT Essentials
Content	
Course Code	C11
Level Classification (Attendees)	Those who aim to acquire the knowledge of ITSS level 3
Precondition	Have completed IT Fundamentals 2 course group, or possess equivalent knowledge
Outline	<p>This course is designed for attendees to acquire basic skills related to technology required to promote of business operations.</p> <p>In this course, attendees deepen the knowledge they gained through IT Fundamental 1 and IT Fundamental 2 and aim at reinforcing the knowledge related to IT technology.</p>
Learning Goal	Can, use the basic knowledge related to technology in order to perform business operations as a member of a project team under the supervision of a superior.
Training and Education Method	e-learning and/or lecture
Evaluation	Attendees are evaluated by following methods; reports, quantitative questionnaires, knowledge tests, and attitude and effort towards exercises.
Curriculum Construction	30 hours (6 hours/day x 5 days)

Skill Item	Knowledge Item
Technology	<ul style="list-style-type: none"> -Internet Technology <ul style="list-style-type: none"> Internet history Web related technology E-mail related technology Encryption technology Digital media related technology (VoIP, Streaming, QoS, etc.) -Computer Systems <ul style="list-style-type: none"> Hardware Operating systems System configuration and architecture System application -Computer Science Bases <ul style="list-style-type: none"> Information basic theory Data structure and algorism -System Platform Technology <ul style="list-style-type: none"> Utilization and practice of operating system technology (main frame, distributed computing (office computer), UNIX, Windows, Linux, etc.) and their actual usage -Database Technology <ul style="list-style-type: none"> Database models Database languages Database control -Understanding and Utilization of Network Technology <ul style="list-style-type: none"> Protocols and transmission control Encoding and transmission Network related Regulations Network security Communication equipment Internet Network software Line-related technology (ATM, frame relay, LAN, WAN, etc.) -Platform Technology <ul style="list-style-type: none"> Hardware architecture Storage management Operating systems Communication control Transaction processing Distributed processing Parallel processing -System Development Environment <ul style="list-style-type: none"> Understanding and utilization of system development methods, languages, tools and software packages

Technology	-Security and Privacy Secret preservation Preventive measures against falsification Intrusion Computer viruses Measures for integrity Measures for availability Measures for safety Social engineering Privacy protection Risk management Guidelines and related regulations
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(2) Table of knowledge items

Common Career/Skills Framework			Information-Technology Engineers Examination		Object			
Area	Major Category	Middle Category	Minor Category					
Technology	1	1	Basic theory	1	Discrete mathematics	*		
				2	Applied mathematics	*		
				3	Theory of information	*		
				4	Theory of communications	*		
				5	Theory of measurement and control	*		
		2	Algorithm and programming	1	Data structure	*		
				2	Algorithm	*		
				3	Programming			
				4	Programming languages			
				5	Other languages			
	2	3	Computer component	1	Processor	*		
				2	Memory	*		
				3	Bus	*		
				4	Input/output interface	*		
				5	Input/output device	*		
			4	System component	1	System configuration	*	
					2	System evaluation indexes	*	
			5	Software	1	Operating system (OS)	*	
					2	Middleware	*	
					3	File system	*	
		4			Development tools	*		
		5			Open source software	*		
		3	3	7	Human interface	1	Human interface technology	
						2	Interface design	
				8	Multimedia	1	Multimedia technology	*
	2					Multimedia application		
	9			Database	1	Database architecture	*	
					2	Database design		
					3	Data manipulation	*	
					4	Transaction processing	*	
					5	Database application		
	10			Network	1	Network architecture	*	
			2		Data communication and control	*		
			3		Communications protocol	*		
			4		Network management	*		
			5		Network application	*		
	11		Security	1	Information security	*		
		2		Information security management	*			
		3		Security technology evaluation	*			
		4		Information security measures	*			
		5		Security implementation technology	*			
4	Development technology	12	System development technology	1	System requirements definition			
				2	Systems architecture design			
				3	Software requirements definition			
				4	Software architecture design and software detailed design			
				5	Software coding and testing			
				6	Software integration and software qualification tests			

Common Career/Skills Framework			Information-Technology Engineers Examination		Object					
Area	Major Category	Middle Category	Minor Category							
				7	System integration and system qualification tests					
				8	Software installation					
				9	Software acceptance					
				10	Software maintenance					
			13	Software development management techniques	1	Development process and methods				
					2	Intellectual property application management				
					3	Development environment management				
					4	Configuration management and change control				
			Management	5	Project management	14	Project management	1	Project integration management	
								2	Project scope management	
3	Project time management									
4	Project cost management									
5	Project quality management									
6	Project human resources-management									
7	Project communications management									
8	Project risk management									
9	Project procurement management									
6	Service management	15		Service management	1	Service management				
					2	Operations design and tools				
					3	Service support				
					4	Service delivery				
					5	Service management foundation				
16	System audit	1	System audit							
		2	Internal control							
Strategy	7	17	System strategy	1	Information systems strategy					
				2	Business process					
				3	Solution business					
		18	System planning	1	Computerization planning					
				2	Requirements definition					
				3	Procurement planning and implementation					
	8	19	Business strategy management	1	Business strategy techniques					
				2	Marketing					
				3	Business strategy and goal/evaluation					
				4	Business management system					
		20	Technological strategy management	1	Planning of technology development strategy					
				2	Technology development plan					
		21	Business industry	1	Business system					
2	Engineering system									
3	e-business									
4	Consumer appliances									
5	Industrial devices			*						
9	Corporate and legal affairs	22	Corporate activities	1	Management & organization theory					
				2	OR and IE					
				3	Accounting and financial affairs					
		23	Legal affairs	1	Intellectual property rights					
				2	Laws on security					

Common Career/Skills Framework			Information-Technology Engineers Examination		Object
Area	Major Category	Middle Category	Minor Category		
			3	Laws on labor and transaction	
			4	Other laws, guidelines, and engineer ethics	*
			5	Standardization	

2. Course corresponding with Industry Business Operations Knowledge Fundamentals course group

2.1 Industry Business Operations Knowledge Fundamentals course

(1) Course details

Course Name	Industry Business Operations Knowledge Fundamentals
Content	
Course Code	C21
Level Classification (Attendees)	Those who aim to acquire the knowledge of ITSS level 3
Precondition	Have completed IT Fundamentals 2 and System Development Fundamentals course groups, or possess equivalent knowledge
Outline	<p>This course is designed for attendees to acquire knowledge related to current industries and their business operations, basic application knowledge that is currently used and considered to be used in the future.</p> <p>Attendees also learn common business operations (e.g., sales, accounting, human recourse management,) performed in many industries, major industry specific business operations, and application types that are used in those common or major business operations. Acquiring basic knowledge of industry business operation is a focus in this course, and only the overview of the industry specific business operations is provided.</p> <p>Attendees should learn specific knowledge related to industry specific business operations after learning the basic knowledge through this course.</p>
Learning Goal	Can, apply the basic knowledge of industry business operations to perform development, operation, and maintenance work independently for both common activities in various industries and major industry specific business activities as a member of an application development team.
Training and Education Method	e-learning and/or lecture
Evaluation	Attendees are evaluated by following methods; reports, quantitative questionnaires, knowledge tests, and attitude and effort towards exercises.
Curriculum Construction	12 hours (6 hours/day x 2 days)

Skill Item	Knowledge Item
Analysis of Business Operations	<ul style="list-style-type: none"> -Industry Knowledge <ul style="list-style-type: none"> Knowledge utilization of industry common applications Knowledge utilization of industry specific applications Industry business trends and technology trends and competitive circumstances Understanding and utilization of industry terms and relevant regulations Understanding and utilization of industry specific business environment Understanding and utilization of industry specific business practices Understanding and utilization of industry specific business operations -Systemization Strategy Formulation <ul style="list-style-type: none"> Understanding of users' visions and goals and business strategies Systemization strategy formulation Systemization strategy formation utilizing application packages -System Value Verification <ul style="list-style-type: none"> IT value definition, framework development of IT value management -Informatization and Management <ul style="list-style-type: none"> Information strategies Corporate accounting Management engineering Utilization of information systems in engineering system area and business system area Understanding and compliance of relevant regulations
General Business Application System Architecture (human resource management, accounting, general affairs, etc.)	<ul style="list-style-type: none"> -Business Environment <ul style="list-style-type: none"> Understanding and utilization of industry business specific environment and social environment Understanding and utilization of industry specific relevant regulations Understanding and utilization of conventions -General Business Contents <ul style="list-style-type: none"> Understanding and utilization of contents and characteristics of general business Understanding and utilization of industry classified standard technology -Latest General Business Trends <ul style="list-style-type: none"> Understanding and utilization of business specific latest trends Understanding and utilization of case examples of business specific system installation

System Architecture for Specific Industry Business Operations	-Industry Knowledge Knowledge utilization of industry common applications Knowledge utilization of industry specific applications Understanding of industry business trends and technology trends and competitive circumstance Understanding and utilization of industry terms and relevant regulations Understanding and utilization of industry specific business environment Understanding and utilization of industry specific business practices Understanding and utilization of industry specific business operations
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(2) Table of Knowledge Items

Common Career/Skills Framework			Information-Technology Engineers Examination		Object				
Area	Major Category	Middle Category	Minor Category						
Technology	1	1	Basic theory	1	Discrete mathematics				
				2	Applied mathematics				
				3	Theory of information				
				4	Theory of communications				
				5	Theory of measurement and control				
		2	Algorithm and programming	1	Data structure				
				2	Algorithm				
				3	Programming				
				4	Programming languages				
				5	Other languages				
	2	3	3	Computer component	1	Processor			
					2	Memory			
					3	Bus			
					4	Input/output interface			
					5	Input/output device			
			4	System component	1	System configuration			
					2	System evaluation indexes			
			5	Software	1	Operating system (OS)			
					2	Middleware			
					3	File system			
		4			Development tools				
		5			Open source software				
		3	3	Technology element	7	Human interface	1	Human interface technology	
							2	Interface design	
						8	Multimedia	1	Multimedia technology
	2							Multimedia application	
	9					Database	1	Database architecture	
					2		Database design		
					3		Data manipulation		
					4		Transaction processing		
					5		Database application		
	10				Network	1	Network architecture		
						2	Data communication and control		
		3	Communications protocol						
		4	Network management						
		5	Network application						
11	Security	1	Information security						
		2	Information security management						
		3	Security technology evaluation						
		4	Information security measures						
		5	Security implementation technology						
4	4	12	System development technology	1	System requirements definition				
				2	Systems architecture design				
				3	Software requirements definition				
				4	Software architecture design and software detailed design				
				5	Software coding and testing				
				6	Software integration and software qualification tests				

Common Career/Skills Framework			Information-Technology Engineers Examination		Object						
Area	Major Category	Middle Category	Minor Category								
				7	System integration and system qualification tests						
				8	Software installation						
				9	Software acceptance						
				10	Software maintenance						
				13	Software development management techniques	1	Development process and methods				
						2	Intellectual property application management				
						3	Development environment management				
						4	Configuration management and change control				
				Management	5	Project management	14	Project management	1	Project integration management	
									2	Project scope management	
		3	Project time management								
		4	Project cost management								
		5	Project quality management								
6	Project human resources-management										
7	Project communications management										
8	Project risk management										
9	Project procurement management										
6	Service management	15	Service management		1	Service management					
					2	Operations design and tools					
					3	Service support					
					4	Service delivery					
16	System audit	1	System audit								
		2	Internal control								
Strategy	7	17	System strategy	1	Information systems strategy	*					
				2	Business process	*					
				3	Solution business	*					
		18	System planning	1	Computerization planning						
				2	Requirements definition						
				3	Procurement planning and implementation						
	8	19	Business strategy management	1	Business strategy techniques	*					
				2	Marketing						
				3	Business strategy and goal/evaluation	*					
				4	Business management system	*					
		20	Technological strategy management	1	Planning of technology development strategy						
				2	Technology development plan						
		21	Business industry	1	Business system	*					
				2	Engineering system	*					
				3	e-business	*					
4	Consumer appliances										
5	Industrial devices										
9	Corporate and legal affairs	22	Corporate activities	1	Management & organization theory	*					
				2	OR and IE	*					
				3	Accounting and financial affairs	*					
		23	Legal affairs	1	Intellectual property rights						
				2	Laws on security						

Common Career/Skills Framework				Information-Technology Engineers Examination		Object
Area	Major Category	Middle Category	Minor Category			
			3	Laws on labor and transaction		
			4	Other laws, guidelines, and engineer ethics		
			5	Standardization		

3. Course corresponding with System Development course group

3.1 System Design Fundamentals course

(1) Course details

Course Name	System Design Fundamentals
Content	
Course Code	C31
Level Classification (Attendees)	Those who aim to acquire the knowledge of ITSS level 3
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge
Outline	<p>This course is designed for attendees to acquire basic knowledge of a broad area related to system design, such as methodologies, techniques, and design patterns that are necessary when designing general information systems regardless application types.</p> <p>Attendees also learn analysis techniques for operational requirements of information systems, important knowledge related to external and internal design, design techniques for user interfaces and system interfaces. Operations associated these techniques and knowledge, such as how to design process flow of information systems, charts and tools used when designing systems, are included in this course as well.</p> <p>In the first half, basic knowledge related to information system design is provided via e-learning. In the last half, in addition to lectures, virtual project of information system development are provided in order for attendees in workshops to learn design work in a practical manner.</p>
Learning Goal	Can, apply the basic knowledge of system design in order to design systems independently as a member of an application development team.
Training and Education Method	e-learning and/or lecture, workshop
Evaluation	Attendees are evaluated by following methods; reports, quantitative questionnaires, knowledge tests, and attitude and effort towards exercises.
Curriculum Construction	First half: 30 hours (6 hours/day x 5 days) Last half: 5 days

Skill Item	Knowledge Item
Analysis of Business Operations	<ul style="list-style-type: none"> -Technical Requirements Analysis <ul style="list-style-type: none"> Analysis of existing IT environment Understanding of new technical requirements Needs analysis and prioritization -Platform Requirements Definitions <ul style="list-style-type: none"> CPU performance estimation Storage capacity estimation Transmission capacity estimation Transaction quantity estimation Response time estimation
Technology	<ul style="list-style-type: none"> -System Platform Technology <ul style="list-style-type: none"> Utilization and practice of operating system technology (main frame, distributed computing (office computer), UNIX, Windows, Linux, etc.) and their actual usage
Design	<ul style="list-style-type: none"> -Requirements Definition <ul style="list-style-type: none"> Clarification of user demands and project scope and their objectives Prioritization in projects and coordination with related departments Implementation of requirement investigation Requirement definition and documentation Resource request investigation Systematization planning -Databases, Middleware, Distributed Computing Design <ul style="list-style-type: none"> Selection of databases, middleware, and distributed computing Understanding of functions and restrictions of databases, middleware, and distributed computing Design of functions and restrictions of databases, middleware, and distributed computing -Understanding and Utilization of Modeling Techniques <ul style="list-style-type: none"> 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 benchmarking techniques

Software Engineering	<ul style="list-style-type: none"> -Design Methods <ul style="list-style-type: none"> Object-oriented design, Structured design Data-oriented design -Development Methods <ul style="list-style-type: none"> 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 -Utilization of Development Support Tools <ul style="list-style-type: none"> Development environment Various application development tools Management tools Debuggers and simulators, etc. -Reuse Methods <ul style="list-style-type: none"> Utilization of software components Deliverables utilization of preceding projects Utilization and practice of reuse methods Architectural patterns Design patterns Framework, etc. -External Design <ul style="list-style-type: none"> External design procedures System function design Data model design Creation of external specifications -Internal Design <ul style="list-style-type: none"> Function design Interface design Internal data design Identification and role-definition of subcomponents Creation of internal specifications -Object-oriented Development <ul style="list-style-type: none"> Basic concept of object-oriented paradigms UML Object-oriented development processes Analysis and design and implementation Major object-oriented techniques -Program Design <ul style="list-style-type: none"> Development techniques and platform selection Program design criteria Creation of program specifications Creation of test plans and specifications -Technical Problem Solving Methods <ul style="list-style-type: none"> Utilization and practice of technical problem solving methods
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(2) Table of Knowledge Items

Common Career/Skills Framework			Information-Technology Engineers Examination		Object				
Area	Major Category	Middle Category	Minor Category						
Technology	1	Basic theory	1	Basic theory	1	Discrete mathematics			
				2	Applied mathematics				
				3	Theory of information				
				4	Theory of communications				
				5	Theory of measurement and control				
			2	Algorithm and programming	1	Data structure			
					2	Algorithm			
					3	Programming			
					4	Programming languages			
					5	Other languages			
	2	Computer system	3	Computer component	1	Processor			
					2	Memory			
					3	Bus			
					4	Input/output interface			
					5	Input/output device			
			4	System component	1	System configuration	*		
					2	System evaluation indexes			
			5	Software	1	Operating system (OS)	*		
					2	Middleware	*		
					3	File system			
					4	Development tools			
					5	Open source software			
			3	Technology element	6	Hardware	1	Hardware	
					7	Human interface	1	Human interface technology	
	2	Interface design							
	8	Multimedia			1	Multimedia technology			
					2	Multimedia application			
	9	Database			1	Database architecture			
					2	Database design	*		
					3	Data manipulation			
					4	Transaction processing			
					5	Database application			
	10	Network			1	Network architecture			
2					Data communication and control				
3					Communications protocol				
4					Network management				
5			Network application						
11	Security	1	Information security						
		2	Information security management						
		3	Security technology evaluation						
		4	Information security measures						
		5	Security implementation technology						
4	Development technology	12	System development technology	1	System requirements definition	*			
				2	Systems architecture design	*			
				3	Software requirements definition	*			
				4	Software architecture design and software detailed design	*			
				5	Software coding and testing	*			
				6	Software integration and software qualification tests				

Common Career/Skills Framework			Information-Technology Engineers Examination		Object				
Area	Major Category	Middle Category	Minor Category						
				7	System integration and system qualification tests				
				8	Software installation				
				9	Software acceptance				
				10	Software maintenance				
			13	Software development management techniques	1	Development process and methods	*		
					2	Intellectual property application management			
					3	Development environment management	*		
					4	Configuration management and change control			
			Management	5	14	Project management	1	Project integration management	
							2	Project scope management	
3	Project time management								
4	Project cost management								
5	Project quality management								
6	Project human resources-management								
7	Project communications management								
8	Project risk management								
9	Project procurement management								
6	Service management	15		Service management	1	Service management			
					2	Operations design and tools			
					3	Service support			
					4	Service delivery			
					5	Service management foundation			
					6	Facility management			
		16		System audit	1	System audit			
					2	Internal control			
Strategy	7	17	System strategy	1	Information systems strategy				
				2	Business process				
				3	Solution business				
		18	System planning	1	Computerization planning				
				2	Requirements definition				
				3	Procurement planning and implementation				
	8	Business strategy	19	Business strategy management	1	Business strategy techniques			
					2	Marketing			
					3	Business strategy and goal/evaluation			
					4	Business management system			
			20	Technological strategy management	1	Planning of technology development strategy			
					2	Technology development plan			
			21	Business industry	1	Business system			
					2	Engineering system			
					3	e-business			
	4	Consumer appliances							
	5	Industrial devices							
	9	Corporate and legal affairs	22	Corporate activities	1	Management & organization theory			
2					OR and IE				
3					Accounting and financial affairs				
23			Legal affairs	1	Intellectual property rights				
				2	Laws on security				

Common Career/Skills Framework				Information-Technology Engineers Examination		Object
Area	Major Category	Middle Category	Minor Category			
			3	Laws on labor and transaction		
			4	Other laws, guidelines, and engineer ethics		
			5	Standardization		

3.2 System Architecture course

(1) Course details

Course Name	System Architecture
Content	
Course Code	C32
Level Classification (Attendees)	Those who aim to acquire the knowledge of ITSS level 3
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge
Outline	<p>This course is designed for attendees to acquire basic knowledge related to information system architecture.</p> <p>In this course, important programming languages in application architecture, major algorithm, how to assess validity of application tests and their results, installation and migration of information systems, and management skills of project progress are included.</p> <p>In the first half, in addition to writing practice for the major programming languages used for developing information systems and programming languages used for middleware, major algorithm, various tools used on programming, and status assessment techniques used for smooth project implementation can be provided via e-learning. In the last half, attendees learn in workshops how to develop systems by utilizing information system environment simulated of an actual one in a practical manner.</p> <p>It is recommended to provide attendees practice environment, which is similar to an actual system development environment, if the first half sessions are provided via e-learning.</p>
Learning Goal	Can, apply the basic knowledge of system architecture to develop systems independently as a member of an application development team.
Training and Education Method	e-learning and/or lecture, workshop
Evaluation	Attendees are evaluated by following methods; reports, quantitative questionnaires, knowledge tests, and attitude and effort towards exercises.
Curriculum Construction	First half: 60 hours (6 hours/day x 10 days) Last half: 5 days

Skill Item	Knowledge Item
Technology	-Computer Science Bases Information basic theory, data structure and algorithm -Programming Languages and Markup Languages Various languages such as C, CC++, COBOL, Java, UML, HTML, and XML Characteristics of notations How to use graphical development environment
Design	-Development Environment Design Definition of development environment requirements Platform selection

Software Engineering	<ul style="list-style-type: none"> -Development Support Tool Utilization <ul style="list-style-type: none"> Development environment Various application development tools Management tools Debuggers and simulators, etc. -Programming Techniques <ul style="list-style-type: none"> Various programming language techniques Utilization and practice of notations -Programming Languages <ul style="list-style-type: none"> Characteristics of various programming languages such as C, C++, COBOL, and Basic Development in graphical development environment -Testing Techniques <ul style="list-style-type: none"> Test case design Specification determination Test environment set-up and management Test data preparation Test tool utilization -Reuse Methods <ul style="list-style-type: none"> Utilization of software components Deliverables utilization of preceding projects Utilization and practice of reuse methods Architectural patterns Design patterns Frameworks, etc. -Object-oriented Development <ul style="list-style-type: none"> Basic concept of object-oriented paradigms UML Object-oriented development processes Analysis and design and implementation Major object-oriented techniques -Verification Method Utilization <ul style="list-style-type: none"> Walk-through and inspection -Technology Verification Methods <ul style="list-style-type: none"> Prototyping, simulation, and modeling -Technical Problem Solving Methods <ul style="list-style-type: none"> Utilization and practice of technical problem solving methods
Project Management	<ul style="list-style-type: none"> -Project Time Management <ul style="list-style-type: none"> Activity definition Activity sequencing Activity resource estimating Activity duration estimating Schedule development Schedule control

(2) Table of Knowledge Items

Common Career/Skills Framework			Information-Technology Engineers Examination		Object			
Area	Major Category	Middle Category	Minor Category					
Technology	1	1	Basic theory	1	Discrete mathematics	*		
				2	Applied mathematics	*		
				3	Theory of information	*		
				4	Theory of communications	*		
				5	Theory of measurement and control			
		2	Algorithm and programming	1	Data structure	*		
				2	Algorithm	*		
				3	Programming	*		
				4	Programming languages	*		
				5	Other languages	*		
	2	3	Computer component	1	Processor			
				2	Memory			
				3	Bus			
				4	Input/output interface			
				5	Input/output device			
			4	System component	1	System configuration		
					2	System evaluation indexes		
			5	Software	1	Operating system (OS)		
					2	Middleware		
					3	File system		
		4			Development tools			
		5			Open source software			
		3	3	7	Human interface	1	Human interface technology	
						2	Interface design	
					8	Multimedia	1	Multimedia technology
	2						Multimedia application	
	9				Database	1	Database architecture	
				2		Database design		
				3		Data manipulation		
				4		Transaction processing		
				5		Database application		
	10			Network	1	Network architecture		
			2		Data communication and control			
			3		Communications protocol			
			4		Network management			
			5		Network application			
	11		Security	1	Information security			
		2		Information security management				
		3		Security technology evaluation				
		4		Information security measures				
		5		Security implementation technology				
4	Development technology	12	System development technology	1	System requirements definition			
				2	Systems architecture design			
				3	Software requirements definition			
				4	Software architecture design and software detailed design	*		
				5	Software coding and testing	*		
				6	Software integration and software qualification tests	*		

Common Career/Skills Framework			Information-Technology Engineers Examination		Object				
Area	Major Category	Middle Category	Minor Category						
				7	System integration and system qualification tests	*			
				8	Software installation				
				9	Software acceptance				
				10	Software maintenance				
			13	Software development management techniques	1	Development process and methods	*		
					2	Intellectual property application management			
					3	Development environment management	*		
					4	Configuration management and change control			
			Management	5	14	Project management	1	Project integration management	
							2	Project scope management	
	3	Project time management					*		
	4	Project cost management							
	5	Project quality management							
6	Project human resources-management								
7	Project communications management								
8	Project risk management								
9	Project procurement management								
6	Service management	15		Service management	1	Service management			
					2	Operations design and tools			
					3	Service support			
4			Service delivery						
5			Service management foundation						
6			Facility management						
16	System audit	1	System audit						
			2	Internal control					
Strategy	7	17	System strategy	1	Information systems strategy				
				2	Business process				
				3	Solution business				
		18	System planning	1	Computerization planning				
				2	Requirements definition				
				3	Procurement planning and implementation				
	8	19	Business strategy management	1	Business strategy techniques				
				2	Marketing				
				3	Business strategy and goal/evaluation				
				4	Business management system				
		20	Technological strategy management	1	Planning of technology development strategy				
				2	Technology development plan				
		21	Business industry	1	Business system				
				2	Engineering system				
				3	e-business				
4	Consumer appliances								
5	Industrial devices								
9	Corporate and legal affairs	22	Corporate activities	1	Management & organization theory				
				2	OR and IE				
				3	Accounting and financial affairs				
		23	Legal affairs	1	Intellectual property rights				
				2	Laws on security				

Common Career/Skills Framework				Information-Technology Engineers Examination		Object
Area	Major Category	Middle Category	Minor Category			
			3	Laws on labor and transaction		
			4	Other laws, guidelines, and engineer ethics		
			5	Standardization		

4. Course corresponding with System Operation / Maintenance course group

4.1 ITSM Fundamentals (I) course

(1) Course details

Course Name	ITSM Fundamentals (I)
Content	
Course Code	C41
Level Classification (Attendees)	Those who aim to acquire the knowledge of ITSS level 3
Precondition	Have completed IT Fundamentals 2 course group, or possess equivalent knowledge
Outline	<p>This course is designed for attendees to deepen their understanding of significance and purposes of service management and to acquire basic knowledge related to service management.</p> <p>For effective understanding of service management and its promotion, this course puts a focus on understanding of significance and purposes of service management and on learning knowledge related to service support.</p>
Learning Goal	Can, apply the basic knowledge related to service management to perform system operation activities as a member of a system operation team under the supervision of superior.
Training and Education Method	Lecture
Evaluation	Attendees are evaluated by following methods; reports, quantitative questionnaires, knowledge tests, and attitude and effort towards exercises.
Curriculum Construction	2 days

Skill Item	Knowledge Item
Relevant Knowledge	<ul style="list-style-type: none"> -Criteria and Standards International standards of IT services International standards of security Criteria of system audit Criteria of corporate accounting Quality management criteria
Business Management	<ul style="list-style-type: none"> -System Operation Management Techniques Incident management Problem management Change control Release management Configuration management Service level management Availability management Capacity management Service continuity management IT service financial management Security management
Service Support	<ul style="list-style-type: none"> -Incident Management Business knowledge Cause investigation of service quality loss How to process system change request How to handle system failures Understanding of possibility of service quality loss -Configuration Management Definition and collection and update of configuration information Checkup of asset management information Practice of configuration management -Incident Management Process Incident acceptance Incident records Incident resolution or dispatch Incident progress management Incident closure
Knowledge of Support Center Infrastructure	<ul style="list-style-type: none"> -Incident Management Systems Functions of incident management systems Advantages of incident management systems Points on installation of incident management systems

(2) Table of Knowledge Items

Common Career/Skills Framework			Information-Technology Engineers Examination		Object				
Area	Major Category	Middle Category	Minor Category						
Technology	1	Basic theory	1	Basic theory	1	Discrete mathematics			
					2	Applied mathematics			
					3	Theory of information			
					4	Theory of communications			
					5	Theory of measurement and control			
			2	Algorithm and programming	1	Data structure			
					2	Algorithm			
					3	Programming			
					4	Programming languages			
					5	Other languages			
	2	Computer system	3	Computer component	1	Processor			
					2	Memory			
					3	Bus			
					4	Input/output interface			
					5	Input/output device			
			4	System component	1	System configuration			
					2	System evaluation indexes			
			5	Software	1	Operating system (OS)			
					2	Middleware			
					3	File system			
					4	Development tools			
					5	Open source software			
			6	Hardware	1	Hardware			
			3	Technology element	7	Human interface	1	Human interface technology	
							2	Interface design	
	8	Multimedia			1	Multimedia technology			
					2	Multimedia application			
	9	Database			1	Database architecture			
					2	Database design			
					3	Data manipulation			
					4	Transaction processing			
					5	Database application			
	10	Network			1	Network architecture			
2					Data communication and control				
3					Communications protocol				
4					Network management				
5			Network application						
11	Security	1	Information security						
		2	Information security management	*					
		3	Security technology evaluation						
		4	Information security measures						
		5	Security implementation technology						
4	Development technology	12	System development technology	1	System requirements definition				
				2	Systems architecture design				
				3	Software requirements definition				
				4	Software architecture design and software detailed design				
				5	Software coding and testing				
				6	Software integration and software qualification tests				

Common Career/Skills Framework			Information-Technology Engineers Examination		Object					
Area	Major Category	Middle Category	Minor Category							
				7	System integration and system qualification tests					
				8	Software installation					
				9	Software acceptance					
				10	Software maintenance					
			13	Software development management techniques	1	Development process and methods				
					2	Intellectual property application management				
					3	Development environment management				
					4	Configuration management and change control	*			
			Management	5	Project management	14	Project management	1	Project integration management	
								2	Project scope management	
	3	Project time management								
	4	Project cost management								
	5	Project quality management								
6	Project human resources-management									
7	Project communications management									
8	Project risk management									
9	Project procurement management									
6	Service management	15		Service management	1	Service management	*			
					2	Operations design and tools	*			
					3	Service support	*			
					4	Service delivery	*			
			5		Service management foundation					
16	System audit	1	System audit	*						
		2	Internal control							
Strategy	7	17	System strategy	1	Information systems strategy					
				2	Business process					
				3	Solution business					
		18	System planning	1	Computerization planning					
				2	Requirements definition					
				3	Procurement planning and implementation					
	8	19	Business strategy management	1	Business strategy techniques					
				2	Marketing					
				3	Business strategy and goal/evaluation					
				4	Business management system					
		20	Technological strategy management	1	Planning of technology development strategy					
				2	Technology development plan					
		21	Business industry	1	Business system					
				2	Engineering system					
				3	e-business					
4	Consumer appliances									
5	Industrial devices									
9	Corporate and legal affairs	22	Corporate activities	1	Management & organization theory					
				2	OR and IE					
				3	Accounting and financial affairs					
		23	Legal affairs	1	Intellectual property rights					
				2	Laws on security					

Common Career/Skills Framework				Information-Technology Engineers Examination		Object
Area	Major Category	Middle Category	Minor Category			
			3	Laws on labor and transaction		
			4	Other laws, guidelines, and engineer ethics		
			5	Standardization	*	

4.2 System Operation / Maintenance course

(1) Course details

Course Name	System Operation / Maintenance
Content	
Course Code	C42
Level Classification (Attendees)	Those who aim to acquire the knowledge of ITSS level 3
Precondition	Have completed System Development Fundamentals course group, or possess equivalent knowledge
Outline	<p>This course is designed for attendees to acquire basic knowledge related to information system operation and maintenance.</p> <p>Attendees learn factors important for smooth information system operations such as management items, management techniques, and management standards. How to handle failures of operating systems and essential middleware components, information systems monitoring, system resource management, preventive measures against failures and recovery, and system maintenance are also included in this course.</p> <p>In the first half, the basic knowledge related to information system operation and maintenance is provided via e-learning.</p> <p>In the last half, in addition to the lectures, attendees learn, in workshops and in a practical manner, operation and maintenance of information systems by using development environment of information systems simulated of actual one prepared in the previous course.</p>
Learning Goal	Can, apply the basic knowledge related to system operation and maintenance to perform business operations independently for it as a member of an application development team.
Training and Education Method	e-learning and/or lecture, workshop
Evaluation	Attendees are evaluated by following methods; reports, quantitative questionnaires, knowledge tests, and attitude and effort towards exercises.
Curriculum Construction	First half: 30 hours (6hours/day x 5 days) Last half: 5 days

Skill Item	Knowledge Item
Technology	<ul style="list-style-type: none"> -System Management Technology <ul style="list-style-type: none"> System resource monitoring techniques Process monitoring techniques Interface technology for system software and middleware management functions Performance measurement techniques Configuration management functions for hardware and software Software distribution functions Job management functions Remote control functions Access management functions User management functions Risk management functions Storage management functions
Software Engineering	<ul style="list-style-type: none"> -Security System Implementation and Inspection <ul style="list-style-type: none"> Selection and installation of security products and tools Security system development Security technique implementation -Technical Problem Solving Methods <ul style="list-style-type: none"> Using technical problem solving skills and their actual usage
General Business Application System Architecture (human resource management, accounting, general affairs, etc.)	<ul style="list-style-type: none"> -General Business Contents <ul style="list-style-type: none"> Understanding and utilization of contents and characteristics of general business Understanding and utilization of industry classified standard technology -Latest General Business Trends <ul style="list-style-type: none"> Understanding and utilization of business specific latest trends Understanding and utilization of case examples of business specific system installation -Industry Knowledge <ul style="list-style-type: none"> Knowledge utilization of industry common applications Knowledge utilization of industry specific applications Industry business trends and technology trends and competitive circumstance Understanding and utilization of industry terms and relevant regulations Understanding and utilization of industry specific business environment Understanding and utilization of industry specific business practices Understanding and utilization of specific business operations

<p>Business Application System Architecture Utilizing Business package</p>	<p>-Business Package Contents Understanding and utilization of contents and characteristics of business packages</p> <p>-Business Package Performance Tuning Utilization and practice of performance tuning methods (trace, debugging, problem identification, problem solving, route optimization techniques, etc.)</p>
<p>Project Management</p>	<p>-Project Integration Management Project charter preparation Preparation of preliminary project scope description documents Preparation of project management plans Direction and management of project implementation Project activity controlling Integrated change control Project termination</p> <p>-Project Time Management Activity definition Activity sequencing Activity resource estimating Activity duration estimating Schedule development Schedule control</p> <p>-Project Risk Management Risk management planning Risk identification Qualitative risk analysis Quantitative risk analysis Risk response planning Risk monitoring and control</p>

(2) Table of Knowledge Items

Common Career/Skills Framework			Information-Technology Engineers Examination		Object		
Area	Major Category	Middle Category	Minor Category				
Technology	1	Basic theory	1	Basic theory	1	Discrete mathematics	
					2	Applied mathematics	
					3	Theory of information	
					4	Theory of communications	
					5	Theory of measurement and control	
			2	Algorithm and programming	1	Data structure	
					2	Algorithm	
					3	Programming	
					4	Programming languages	
					5	Other languages	
	2	Computer system	3	Computer component	1	Processor	
					2	Memory	
					3	Bus	
					4	Input/output interface	
					5	Input/output device	
			4	System component	1	System configuration	
					2	System evaluation indexes	
			5	Software	1	Operating system (OS)	
					2	Middleware	
					3	File system	
					4	Development tools	
					5	Open source software	
	6	Hardware	1	Hardware			
	3	Technology element	7	Human interface	1	Human interface technology	
					2	Interface design	
			8	Multimedia	1	Multimedia technology	
					2	Multimedia application	
			9	Database	1	Database architecture	
					2	Database design	
					3	Data manipulation	
					4	Transaction processing	
					5	Database application	
			10	Network	1	Network architecture	
2					Data communication and control		
3					Communications protocol		
4					Network management		
5					Network application		
11			Security	1	Information security		
				2	Information security management		
				3	Security technology evaluation		
				4	Information security measures	*	
	5	Security implementation technology					
4	Development technology	12	System development technology	1	System requirements definition		
				2	Systems architecture design		
				3	Software requirements definition		
				4	Software architecture design and software detailed design		
				5	Software coding and testing		

Common Career/Skills Framework			Information-Technology Engineers Examination		Object			
Area	Major Category	Middle Category	Minor Category					
				6	Software integration and software qualification tests			
				7	System integration and system qualification tests			
				8	Software installation			
				9	Software acceptance			
				10	Software maintenance			
			13	Software development management techniques	1	Development process and methods		
					2	Intellectual property application management		
					3	Development environment management		
					4	Configuration management and change control	*	
	Management	5	Project management	14	Project management	1	Project integration management	*
						2	Project scope management	
						3	Project time management	*
4						Project cost management		
5						Project quality management		
6						Project human resources-management		
7						Project communications management		
8						Project risk management	*	
9						Project procurement management		
6		Service management	15	Service management	1	Service management		
					2	Operations design and tools		
					3	Service support		
					4	Service delivery	*	
	5				Service management foundation			
16	System audit	1	System audit					
		2	Internal control					
Strategy	7	17	System strategy	1	Information systems strategy			
				2	Business process			
				3	Solution business			
		18	System planning	1	Computerization planning			
				2	Requirements definition			
				3	Procurement planning and implementation			
	8	19	Business strategy management	1	Business strategy techniques			
				2	Marketing			
				3	Business strategy and goal/evaluation			
				4	Business management system			
		20	Technological strategy management	1	Planning of technology development strategy			
				2	Technology development plan			
		21	Business industry	1	Business system	*		
2	Engineering system			*				
3	e-business			*				
4	Consumer appliances							
5	Industrial devices							
9	Corporate and legal affairs	22	Corporate activities	1	Management & organization theory			
				2	OR and IE			
				3	Accounting and financial affairs			

Common Career/Skills Framework			Information-Technology Engineers Examination		Object	
Area	Major Category	Middle Category	Minor Category			
		23	Legal affairs	1	Intellectual property rights	
				2	Laws on security	
				3	Laws on labor and transaction	
				4	Other laws, guidelines, and engineer ethics	
				5	Standardization	

4.3 Relevant Knowledge course

(1) Course details

Course Name Content	Relevant Knowledge
Course Code	C43
Level Classification (Attendees)	Those who aim to acquire the knowledge of ITSS level 3
Precondition	Have completed IT Fundamentals 2 course group, or possess equivalent knowledge
Outline	This course is designed for attendees to acquire important knowledge related to laws, ethics, contracts, criteria and standards necessary for promoting business operations.
Learning Goal	Can, apply the basic knowledge related to business operations independently as a member of a project team.
Training and Education Method	e-learning and/or lecture
Evaluation	Attendees are evaluated by following methods; reports, quantitative questionnaires, knowledge tests, and attitude and effort towards exercises.
Curriculum Construction	6 hours (6 hours x 1 day)

Skill Item	Knowledge Item
Relevant Knowledge	<ul style="list-style-type: none">-Knowledge of Relevant Regulations Relevant regulations, accepted norms-Corporate Ethics Compliance with codes of corporate ethics-Contract Administration Understanding of contract work Confirmation and agreement of contract conditions Contract closure Exception handling Understanding of outsourcing agreement work Understanding and compliance of relevant regulations-Criteria and Standards International standards of IT services International standards of security Criteria of system audit Criteria of corporate accounting Quality management criteria

(2) Table of Knowledge Items

Common Career/Skills Framework			Information-Technology Engineers Examination		Object				
Area	Major Category	Middle Category	Minor Category						
Technology	1	Basic theory	1	Basic theory	1	Discrete mathematics			
					2	Applied mathematics			
					3	Theories associated with information			
					4	Theories associated with communications			
					5	Theories associated with measurements and control			
			2	Algorithm and programming	1	Data structure			
					2	Algorithm			
					3	Programming			
					4	Programming language			
					5	Other languages			
	2	Computer system	3	Computer components	1	Processor			
					2	Memory			
					3	Bus			
					4	Input/output interface			
					5	Input/output device			
			4	System components	1	System configuration			
					2	System evaluation indexes			
			5	Software	1	Operating system			
					2	Middleware			
					3	File system			
					4	Development tool			
					5	Open source software			
			3	Technology element	6	Hardware	1	Hardware	
					7	Human interface	1	Human interface technology	
	2	Interface design							
	8	Multimedia			1	Multimedia technology			
					2	Multimedia application			
	9	Database			1	Database architecture			
					2	Database design			
					3	Data manipulation			
					4	Transaction processing			
					5	Database application			
10	Network	1			Network architecture				
		2	Data communication and control						
		3	Communications protocol						
		4	Network management						
		5	Network application						
11	Security	1	Information security						
		2	Information security management						
		3	Security technology evaluation	*					
		4	Information security measures						
		5	Security implementation technology						
4	Development technology	12	System development technology	1	System requirements definition				
				2	Systems architecture design				
				3	Software requirements definition				
				4	Software architecture design/software detailed design				
				5	Software coding and test				
				6	Software integration/ qualification test				

Common Career/Skills Framework			Information-Technology Engineers Examination		Object					
Area	Major Category	Middle Category	Minor Category							
				7	System integration/qualification test					
				8	Software installation					
				9	Software acceptance					
				10	Software maintenance					
			13	Software development management techniques	1	Development process and methods				
					2	Intellectual property application management				
					3	Development environment management				
					4	Configuration management/change control				
			Management	5	Project management	14	Project management	1	Project management integration	
								2	Project scope management	
	3	Project time management								
	4	Project cost management								
	5	Project quality management								
6	Project human resources-management									
7	Project communications management									
8	Project risk management									
9	Project procurement management									
6	Service management	15		Service management	1	Service management				
					2	Operations design and tools				
					3	Service support				
			4		Service delivery					
			5		Service management foundation					
16	System audit	1	System audit							
			2	Internal control	*					
Strategy	7	17	System strategy	1	Information systems strategy					
				2	Business process					
				3	Solution business					
		18	System planning	1	System utilization promotion/evaluation					
				2	Computerization planning					
				3	Requirements definition					
	8	19	Business strategy management	1	Procurement planning and implementation					
				2	Business strategy techniques					
				3	Marketing					
				4	Business strategy and goal/evaluation					
		20	Technological strategy management	1	Business management system					
				2	Planning of technology development strategy					
		21	Business industry	1	Technology development plan					
				2	Business system					
				3	Engineering system					
4	e-business									
5	Consumer appliances									
9	Corporate and legal affairs	22	Corporate activities	1	Industrial devices					
				2	Management & organization theory					
				3	OR and IE					
		23	Legal affairs	1	Accounting and financial affairs	*				
				2	Intellectual property rights	*				
				3	Security related laws and regulations	*				
	4			Laws on labor and transaction	*					

Common Career/Skills Framework			Information-Technology Engineers Examination		Object
Area	Major Category	Middle Category	Minor Category		
			5	Other laws, guidelines, and engineer ethics	*

5. Course corresponding with Project Management Fundamentals course group

5.1 Project Management Fundamentals course

(1) Course details

Course Name	Project Management Fundamentals
Content	
Course Code	C51
Level Classification (Attendees)	Those who aim to acquire the knowledge of ITSS level 3
Precondition	Possess basic knowledge of both IT and system development, and have experience of participation in projects such as system development or system operation management
Outline	This course is designed for attendees to acquire basic knowledge related to project management. Attendees learn, based on PMBOK, a concept of general project management which is regardless of characteristics of any industries or fields, and which include basic knowledge of overall project management (e.g., project definitions, organization, making plans, developing schedules, project implementation and management, project completion).
Learning Goal	Can, apply the basic knowledge related to project management to perform business operations for it as a member of a project team.
Training and Education Method	e-learning and/or lecture
Evaluation	Attendees are evaluated by following methods; reports, quantitative questionnaires, knowledge tests, and attitude and effort towards exercises.
Curriculum Construction	30 hours (6 hours/day x 5 days)

Skill Item	Knowledge Item
Project Management	<ul style="list-style-type: none"> -Project Integration Management <ul style="list-style-type: none"> Project charter preparation Preparation of preliminary project scope description documents Preparation of project management plans Direction and management of project implementation Project activity controlling Integrated change control Project termination -Project Scope Management <ul style="list-style-type: none"> Scope planning Scope definition WBS creation Scope verification Scope control -Project Time Management <ul style="list-style-type: none"> Activity definition Activity sequencing Activity resource estimating Activity duration estimating Schedule development Schedule control -Project Cost Management <ul style="list-style-type: none"> Cost estimation Cost budgeting Cost control -Project Quality Management <ul style="list-style-type: none"> Quality planning Quality assurance Quality management -Project Human Resources Management <ul style="list-style-type: none"> Human resources planning Project team organization Project team development Project team management -Project Communications Management <ul style="list-style-type: none"> Communications planning Information distribution Performance reporting Stakeholder management

Project Management	<ul style="list-style-type: none">-Project Risk Management<ul style="list-style-type: none">Risk management planningRisk identificationQualitative risk analysisQuantitative risk analysisRisk response planningRisk monitoring and control-Project Procurement Management<ul style="list-style-type: none">Purchase and acquisition planningContract planningSeller response requestSeller selectionContract administrationContract closure
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(2) Table of Knowledge Items

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					2	Algorithm				
					3	Programming				
					4	Programming language				
					5	Other languages				
	2	Computer system Basic theory	3	Computer components	1	Processor				
					2	Memory				
					3	Bus				
					4	Input/output interface				
					5	Input/output device				
			4	System components	1	System configuration				
					2	System evaluation indexes				
			5	Software	1	Operating system				
					2	Middleware				
					3	File system				
					4	Development tool				
					5	Open source software				
			3	Technology element	1	Basic theory	1	Discrete mathematics		
							7	Human interface	1	Human interface technology
					2				Interface design	
	8	Multimedia			1		Multimedia technology			
					2		Multimedia application			
	9	Database			1		Database architecture			
					2		Database design			
					3		Data manipulation			
					4		Transaction processing			
					5		Database application			
	10	Network			1		Network architecture			
2					Data communication and control					
3					Communications protocol					
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5					Network application					
11	Security	1			Information security					
		2			Information security management					
		3			Security technology evaluation					
		4	Information security measures							
		5	Security implementation technology							
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				2	Systems architecture design					
				3	Software requirements definition					
				4	Software architecture design/software detailed design					
				5	Software coding and test					
				6	Software integration/ qualification test					

Common Career/Skills Framework			Information-Technology Engineers Examination		Object						
Area	Major Category	Middle Category	Minor Category								
Management				7	System integration/qualification test						
				8	Software installation						
				9	Software acceptance						
				10	Software maintenance						
			13	Software development management techniques	1	Development process and methods					
					2	Intellectual property application management					
					3	Development environment management					
					4	Configuration management/change control					
					5	Project management	14	Project management	1	Project management integration	*
									2	Project scope management	*
	6	Service management	15	Service management	3	Project time management	*				
					4	Project cost management	*				
					5	Project quality management	*				
6					Project human resources-management	*					
7					Project communications management	*					
8					Project risk management	*					
9					Project procurement management	*					
Strategy	7	17	System strategy	1	Service management						
				2	Operations design and tools						
				3	Service support						
		18	System planning	4	Service delivery						
				5	Service management foundation						
				6	Facility management						
	8	Business strategy	19	Business strategy management	1	System audit					
					2	Internal control					
			20	Technological strategy management	1	Information systems strategy					
					2	Business process					
9	Corporate and legal affairs	22	Corporate activities	3	Solution business						
				1	System utilization promotion/evaluation						
				2	Computerization planning						
		21	Business industry	3	Requirements definition						
				1	Procurement planning and implementation						
2	Business strategy techniques										
3	Marketing										
4	Business strategy and goal/evaluation										
1	Business management system										
2	Planning of technology development strategy										
1	Technology development plan										
2	Business system										
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2	Management & organization theory										
3	OR and IE										
1	Accounting and financial affairs										
2	Intellectual property rights										
3	Security related laws and regulations										
4	Laws on labor and transaction										

Common Career/Skills Framework			Information-Technology Engineers Examination		Object
Area	Major Category	Middle Category	Minor Category		
			5	Other laws, guidelines, and engineer ethics	

ITSS Model Curriculum –To get level 3–

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