Curriculum Guidelines for the 12-Year Basic Education

Vocational Senior High School

The Domain of Technology

Ministry of Education

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I. Fundamental Beliefs

As industrial structure changes rapidly, Taiwan's technical and vocational education should not only cultivate students' professional competencies in different fields by respecting their individual interests, but also ensure the basic literacies of skilled labor at ground levels. The traditional Basic Education Program of the past focused on cultivating the basic literacies of reading, writing, and arithmetic. However, with the rapid development of technology, technological literacy has quickly become another basic literacy that all citizens should possess. The curriculum of the technology domain aims to cultivate this necessary technological literacy, with a focus on the use of technological tools, materials, and resources to engage in systematic thinking and problem solving. This is intended for cultivating students' basic abilities in designing, producing, and applying information systems, thereby developing their logical and computational thinking, problem-solving abilities, innovative design, critical thinking, and other higher-order thinking skills. In addition, the application of technology requires the use of various natural resources; teaching students how to effectively utilize resources and possess the correct attitudes toward sustainable business will therefore enable the friendly coexistence of technology with society and the environment. This proper allocation of resources is also one of the teaching focuses in the technology domain.

In response to the needs of the technological age, most developed countries have incorporated technological literacy as part of the basic literacies required by citizens to learn, and have used technology-related courses to integrate science, technology, engineering, arts, and mathematics to reinforce the connectivity of interdisciplinary knowledge. Over the course of the education reforms in Taiwan, no effort has been spared in investments in science and mathematics education, but the reinforcement of integrative planning is still needed in the domains of technology and engineering. As the disciplines in vocational senior high schools are characterized by their applicability, it is even more important that the curriculum of the technology domain should strengthen the application and integration of technology with knowledge of other disciplines.

The curriculum of the technology domain includes two subjects: living technology and information technology. The main developmental focus of living technology is on technological exploration and hands-on learning, with "design thinking" as its main curricular focus. Its emphasis is on students' application of multidisciplinary knowledge such as science, technology,

engineering, arts, and mathematics, in order to cultivate their capabilities in design, production, and inquiry-based thinking. In addition, project production activities are also used to help students integrate multidisciplinary knowledge to solve practical problems and unleash their creativity to create applicable technological products. Information technology is mainly centered on "computational thinking," and its main subject matter encompasses the principles and application of computer science, the design and hands-on experience of information systems, and the relationship of information technology with society. The information technology curriculum will focus on the exploration of computer science, which combines the learning of concepts and skills related to computer science together with the design and hands-on experience of information systems to cultivate students' capabilities in logical and systematic thinking. In addition, the curriculum content will also establish the attitude and responsibility that citizens of a digital world should possess through discussions on social, natural and cultural issues.

In summary, the technology domain curriculum is an integrative discipline containing cross-disciplinary knowledge, allowing students to learn about integrating knowledge of related disciplines through hands-on project-based activities. Its curriculum content emphasizes the cultivation of "computational thinking" and "design thinking" capabilities, inculcating civic attitudes and responsibilities that students should possess in modern society through discussions of social issues.

II. Educational Goals and Curriculum Goals

1. Educational goals of vocational senior high schools aim to help students
   (1) Cultivate core competencies to shape modern citizens
   (2) Reinforce basic knowledge and guide lifelong learning
   (3) Cultivate professional skills to meet the needs of industry
   (4) Inculcate moral character and enhance personal value
2. Curriculum goals of the technology domain aim to help students
   (1) Acquire basic technological knowledge and skills
   (2) Develop correct technological concepts, attitudes, and work habits
   (3) Become proficient in the use of technological knowledge and skills adopting creative, design, critical, logical, and computational thinking
   (4) Integrate theory and practice to solve problems and meet needs

(5) Understand the technology industry and its future developmental trends

(6) Develop an interest in technological research, development and creation, regardless of gender, and engage in relevant career exploration and preparation

(7) Understand the interactions between technology and individuals, society, culture and the environment, and reflect on ethical issues related to practice

III. Time Allocation and Subject Combinations

The technology domain encompasses two subjects: living technology and information technology. Its time allocation is as follows:

<table>
<tr><th colspan="2" rowspan="3">Course type</th><th colspan="2" rowspan="3">Domain/subject and no. of credits</th><th colspan="6">Recommended course arrangement by year and credit allocation</th><th rowspan="3">Remarks</th></tr>
<tr><th colspan="2">First academic year</th><th colspan="2">Second academic year</th><th colspan="2">Third academic year</th></tr>
<tr><th colspan="2">Name</th><th colspan="2">Name</th><th>Credits</th><th>1</th><th>2</th><th>1</th><th>2</th><th>1</th><th>2</th></tr>
<tr><td rowspan="8">Ministry-mandated required courses</td><td rowspan="8">General courses</td><td rowspan="6">Integrative activities</td><td>Life education</td><td rowspan="8">4</td><td></td><td></td><td></td><td></td><td></td><td></td><td rowspan="8">The integrative activities domain includes five subjects: life education, career planning, home economics, law and life, and introduction to environmental science. The technology domain includes two subjects: living technology and information technology. Each school can choose to offer two subjects for a total of four credits.</td></tr>
<tr><td>Career planning</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Home economics</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Law and life</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Introduction to environmental science</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Technology</td><td>Living technology</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Information Technology</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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IV. Core Competency

The following table shows the representation of the domain of Technology by following the specific content of the various educational stages core competency in the *General Guidelines* and combining them with the domain of Technology's Learning Focus and Core Competencies.

Core Competency Dimension	Core Competency Item	Item Description	Core Competencies of the domain of Technology	
			Junior High School (J)	Vocational Senior High School (V-U)
A **Autonomous Action**	**A1** **Physical and Mental Wellness and Self-Advancement**	Possess the ability to conduct sound physical and mental developments, and maintain an appropriate view of humans and self. Through decision making, analyses, and knowledge acquisition, students can effectively plan their career paths, search for meaning in life, and continually strive for personal growth.	科-J-A1 Have a good attitude towards technology. Be able to apply technological competence to reach one's potential.	科 V-U-A1 Possess knowledge and ability to apply technology and effectively plan career for personal growth.
	A2 **Logical Thinking and Problem Solving**	Possess competency in systematic thinking to understand problems, engage in analyses, think critically, and endeavor in meta-thoughts, with the ability to reflect and conduct actions, to effectively tackle and solve problems in daily life.	科-J-A2 Use technology tools to understand and summarize problems, then come up with simple solutions.	科 V-U-A2 Process the skills of thinking systematically, analyzing, exploring, and integrating methods and tools of science, technology, engineering, art, and mathematics to effectively address and solve problems.
	A3 **Planning, Execution, Innovation, and Adaptation**	Possess the ability to devise and execute plans, as well as the ability to explore and develop a variety of professional knowledge; enrich life experience and fully utilize creativity to improve one's adaptability to social change.	科-J-A3 Utilize technology resources to formulate and implement technology research projects.	科 V-U-A3 Process the skills of integrating technology resources for planning, execution, evaluation, and reflection. Respond to new situations and problems with technological innovative attitudes and actions.

Core Competency Dimension	Core Competency Item	Item Description	Core Competencies of the domain of Technology	
			Junior High School (J)	Vocational Senior High School (V-U)
B Communication and Interaction	B1 Semiotics and Expression	Possess the ability to understand and use various types of symbols, including languages, characters, mathematics and science, bodily postures, and arts to communicate and interact with others, and understand and feel empathy for others. Be able to make use of these abilities in daily life or at the workplace.	科-J-B1 Express and communicate in everyday life using scientific notations and computational thinking.	科 V-U-B1 Express with reasonable use of scientific notations and computational thinking. Effectively express one's ideas and experiences, and communicate with others to solve problems.
	B2 Information Technology Literacy and Media Literacy	Possess the ability to effectively use technology, information, and media of all types, develop competencies related to ethics and media literacy, and develop the ability to analyze, speculate about, and criticize humans' relationships with technology, information, and media.	科-J-B2 Understand basic principles of information and technology. Possess media literacy, and understand interplay between people and technology, information and media.	科 V-U-B2 Understand principles and development trends of technology and information. Be able to integrate and use technology, information, and media. Analyze, think critically, and criticize relationship between people and technology, society, and the environment.
	B3 Artistic Appreciation and Aesthetic Literacy	Possess the abilities of art awareness, creation, and appreciation, experience artistic culture through reflection on arts in daily life, enrich artistic experiences, and develop the ability to appreciate, create, and share arts.	科-J-B3 Understand characteristics of aesthetics applied to technology, and conduct technological creation and sharing.	科 V-U-B3 Be able to appreciate the aesthetics of technological creation so as to create, disseminate, and share technology and art.

Core Competency Dimension	Core Competency Item	Item Description	Core Competencies of the domain of Technology	
			Junior High School (J)	Vocational Senior High School (V-U)
C Social Participation	C1 Moral Praxis and Citizenship	Possess competency in putting morality in practice from the personal sphere to the social sphere, and gradually develop a sense of social responsibility and civic consciousness; take the initiative in concern for public topics and actively participate in community events; pay attention to the sustainable development of humanity and the natural environment; and exhibit the qualities of moral character to recognize, appreciate, and practice good deeds.	科-J-C1 Understand technological and sociocultural issues. Cultivate the law-abiding mindset and civic awareness regarding technological development.	科 V-U-C1 Process the skills of thinking critically and reflecting on technological and sociocultural issues. Be able to take active interests in social issues and ethical liability arising out of technological development.
	C2 Interpersonal Relationships and Teamwork	Possess the competency in exhibiting friendly interpersonal feelings and the ability to establish strong interactive relationships; establish communication channels with others, tolerate outsiders, and participate and serve in social activities and other activities requiring teamwork.	科-J-C2 Use technology tools for communication, coordination, and teamwork to complete technology projects.	科 V-U-C2 Appropriately use technology tools to organize teams, and communicate and coordinate for collaboration.
	C3 Multi-cultural and Global Understanding	Stick to one's own cultural identity, respect and appreciate multiculturalism, show active concern for global issues and international situations, demonstrate the ability to adapt to the contemporary world and to social needs, develop international understanding and a multicultural value system, and strive for world peace.	科-J-C3 Use technology tools to understand current state of domestic and global technological developments or other local and international affairs.	科 V-U-C3 Use technology to care, observe, and understand the current state of domestic and global technological developments or local and international affairs, and respect and appreciate differences.

V. Learning Focus

The technology domain curriculum covers two subjects: information technology and living technology. The information technology curriculum allows students to learn about concepts related to computer science in order to foster their computational thinking abilities. The living technology curriculum allows students to learn about technological concepts, tools, and skills for general applications in life in order to cultivate their design and production capabilities. Hence, computational thinking and design thinking are regarded as the main contents of the learning focus for information technology and living technology, respectively. The learning focus of the technology domain curriculum is composed of "learning performances" and "learning contents." "Learning performances" refer to students' specific performance in the core competencies, which is also the basis for teachers' evaluation. "Learning contents" are the key facts, concepts, theories and principles, skills, attitudes, and meta-cognition in the technology domain, which will serve as the basis for future curriculum design, development of teaching materials, and textbook compilation.

1. Learning Performance

The learning performances of the technology domain curriculum include two dimensions, "computational thinking" and "design thinking." The learning performances of computational thinking consist of four categories: computational thinking and problem-solving, collaborative and creative computing, presentation and communication about computing, and attitudes toward computing, which are explained below:

(1) Computational thinking and problem-solving: Be able to use computational tools to assist thinking in order to analyze problems, develop solutions, and make effective decisions.

(2) Collaborative and creative computing: Be able to use information technology to collaborate with others and carry out creations.

(3) Presentation and communication about computing: Be able to use computational tools to present ideas and communicate with others.

(4) Attitudes toward computing: Be able to establish healthy, sensible, and legal attitudes and habits toward computing, and be willing to explore information technology.

The learning performances of design thinking consist of four categories, technological knowledge for everyday life, attitudes toward everyday technology usage, hands-on skills for everyday technology, and integration of technological competencies, all of which are explained below:

(1) Technological knowledge for everyday life: It includes nature and evolution of technology, technological concepts and processes, impact evaluation, and others. It focuses on cultivating students' understanding about the nature and evolution of technology, a conceptual understanding of technology (e.g., principles of technology, knowledge of tool use, and material handling etc.), knowledge of technological processes (e.g., problem-solving, engineering design, etc.), and the impact evaluation of technology (e.g., interactions between technology and society, and between technology and the environment).

(2) Attitudes toward everyday technology usage: It includes interests, attitudes, habits, career exploration and others. It focuses on cultivating students' interests in learning about technology and correct attitudes toward technology usage, cultivating the best habits through hands-on practice.

(3) Hands-on skills for everyday technology: It includes handling, usage, and maintenance of technology tools. It focuses on cultivating students' ability to handle and use technology tools and products, and ability to maintain these tools and products.

(4) Integration of technological competencies: Technological competencies include design, implementation, integration, creativity, communication, and others. It focuses on cultivating students' ability to integrate technological knowledge with practical design and implementation, as well as ability to communicate and collaborate effectively during the integration process, which can facilitate the development of creativity.

The encoding of learning performances of the technology domain curriculum is explained below:

(1) The first code, consisting of two letters, describes the dimension and category of learning performances.

(2) The second code is the learning stage, where V represents the fifth learning stage (Grades 10–12 of senior high school).

(3) The third code is a serial number.

First Code		Second Code	Third Code
Dimension	**Category**	**Learning Stage**	**Serial No.**
Computational thinking (C)	Computational thinking and problem solving (t) Collaborative and creative computing (c) Presentation and communication about computing (p) Attitudes toward computing (a)	V	1, 2, 3……
Design thinking (D)	Technological knowledge for everyday life (k) Attitudes toward everyday technology usage (a) Hands-on skills for everyday technology (s) Integration of technological competencies (c)	V	1, 2, 3……

The learning performances of the technology domain curriculum are summarized into the following table:

Dimension	Category	Learning Performance	
Computational thinking (C)	Computational thinking and problem solving (t)	C-t-V-1	Be able to use programming to implement the solutions of computational thinking.
		C-t-V-2	Be able to apply computational thinking to evaluate the pros and cons of solutions.
	Collaborative and creative computing (c)	C-c-V-1	Be able to understand the concepts of project management.
		C-c-V-2	Be able to select appropriate computational tools to conduct collaborative projects.
	Presentation and Communication about computing (p)	C-p-V-1	Be able to integrate information technology to achieve effective communication and presentation.
	Attitudes toward computing	C-a-V-1	Be able to practice healthy and appropriate digital citizenship.

Dimension	Category	Learning Performance	
	(a)	C-a-V-2	Be able to adopt multiple perspectives to speculate about issues related to information technology.
		C-a-V-3	Be willing to explore emerging information technologies.
Design thinking (D)	Technological knowledge for everyday life (k)	D-k-V-1	Be able to understand the basic knowledge of engineering and engineering design.
		D-k-V-2	Be able to understand the current status of the technology industry and trends of technological development.
		D-k-V-3	Be able to analyze, speculate, and criticize the relationship of humans with technology, society, and the environment.
	Attitudes toward everyday technology usage (a)	D-a-V-1	Be able to proactively explore new concepts related to technology.
		D-a-V-2	Be able to think about the choice of technology and issues of sustainable development from the perspective of caring for the natural ecosystem and the social sciences and humanities.
		D-a-V-3	Be able to proactively pay attention to and participate in technological issues in daily life, regardless of gender.
	Hands-on skills for everyday technology (s)	D-s-V-1	Be able to use drawing software or related technology to express design ideas.
		D-s-V-2	Be able to use materials and tools effectively and flexibly according to practical needs, and to perform precise processing and handling.
		D-s-V-3	Be able to use technological tools to repair and modify technological products.
	Integration of technological competencies (c)	D-c-V-1	Be able to use the engineering design process to plan, analyze, and execute project plans to solve practical problems.
		D-c-V-2	Be able to use technological knowledge and skills and innovative thinking to design and actually produce technological products.
		D-c-V-3	Be able to communicate, coordinate and organize work teams.

2. Learning Content

The technology domain curriculum covers two subjects: information technology and living technology. The learning contents are divided into ten themes. Information technology includes six themes, algorithms, programming, system platforms, data representation, processing, and analysis, the application of information technology, and information technology, human, and society. Living technology includes four themes, the nature of

technology, design and production, the application of technology, and technology and society.

The encoding of the learning contents of technology domain curriculum is explained below:

(1) The first code, consisting of two symbols, describes the subject and theme, where "I" denotes information technology, "L" denotes living technology, and capitalized English letters denote the themes of the learning contents.

(2) The second code is the learning stage, where V represents the fifth learning stage (Grades 10–12 of senior high school).

(3) The third code is a serial number.

First Code		Second Code	Third Code
Subject	**Theme**	**Learning Stage**	**Serial No.**
Information technology (I)	System platforms (S), Data representation, processing and analysis (D), Algorithms (A), Programming (P), Application of information technology (T), Information technology, human, and society (H).	V	1, 2, 3……
Living technology (L)	Nature of technology (N), Design and production (P), Application of technology (A), Technology and society (S)	V	1, 2, 3……

(1) Information Technology

The philosophy of the information technology curriculum is to cultivate students' higher-order thinking skills and key capabilities through theories and application of information technology, in hopes that they can face the challenges of life and work in the 21st century. By studying information technology courses, students will be able to use computational thinking and information technology to effectively solve problems in life and learning, and to engage in communication and presentation, while also creating information technology artifacts collaboratively. In addition, the information technology curriculum can also help students establish attitudes desirable in the digital world, cultivate the correct usage habits of information technology through the understanding of issues related to information technology and human society, abiding by relevant ethics, moral

values, and laws; and care about various issues encountered in the digital world.

The learning contents of information technology were formulated according to the basic subject matter of information technology, while also reflecting its current trends and future developments. The aim of the learning contents is to cultivate in students a basic skillset in information technology that can move forward with the times, enabling them to become proactive and responsible digital citizens. Therefore, the learning contents of information technology include: system platforms, data representation, processing, and analysis, algorithms, programming, the application of information technology, and information technology, human, and society, as described below:

A. System platforms: It includes the usage methods, basic architecture, working principles, and future developments of various computing systems, such as personal computers, mobile devices, the Internet, and cloud computing platforms.
B. Data representation, processing, and analysis: It includes the attributes, representations, transformation, analysis, and application of digital data.
C. Algorithms: It includes the concepts, principles, representation methods, application design, and performance analysis of algorithms.
D. Programming: It includes concepts, hands-on experience, and application of programming.
E. The application of information technology: It includes the usage methods of various common Internet technology application software and network services for their application to the fundamental beliefs of project management.
F. Information technology, human, and society: It includes the fair use principles for information technology, and the relevant ethical, legal, and social issues of information technology.

The following describes the learning contents of the information technology curriculum:

Theme	Learning Content	
System platforms (S)	I-S-V-1	Operations of system platforms
	I-S-V-2	Future development trends of system platforms

Data representation, processing, and analysis (D)	I-D-V-1 I-D-V-2	Common algorithms and tools for data processing Concepts and methods of data processing
Algorithms (A)	I-A-V-1 I-A-V-2	Concept and application of common data structures Common algorithms in information technology
Programming (P)	I-P-V-1 I-P-V-2 I-P-V-3	Hands-on structured programming Hands-on programming of basic algorithms Hands-on modular programming
Application of information technology (T)	I-T-V-1	Concept of digital collaboration and use of tools
Information technology, human, and society (H)	I-H-V-1 I-H-V-2 I-H-V-3	Fair use principles for information technology Personal data protection and information security Influence and impacts of information technology on humans and society

(2) Living Technology

The philosophy of the living technology curriculum is to guide students to design and produce useful and applicable items based on the needs of life. It also aims to teach students how to engage in trial and error and systematic thinking during the process of design and production. The subject matter of the living technology curriculum is centered around “do, use, think,” that is, to cultivate students’ abilities in hands-on practical application, the use of technological products, and design and critical thinking.

The learning contents of living technology emphasizes the use of project production activities in engineering design, which allow students to learn about the integration of interdisciplinary knowledge (e.g., science, technology, engineering, and mathematics), through which higher-order thinking skills such as design, innovative and creative thinking are cultivated. More specifically, the learning contents are mainly divided into four themes: the nature of technology, design and production, application of technology, and technology and society, as described below:

A. Nature of technology: introducing the application of engineering design to technology, and the application and integration of engineering, science, art, and mathematics knowledge.
B. Design and production: introducing the steps involved in engineering design to

help students understand how to define problems and develop solutions, using predictive analysis, production model/prototyping, testing, refinement, and optimization.

C. Application of technology: introducing the two main axes of mechanisms and structures, and mechatronics and control. The module on mechanisms and structures mainly enable students to understand the simulation and analysis of mechanisms and structures, and their real-life applications. The mechatronics and control module mainly enable students to understand the basic concepts of mechatronics and control, and their real-life applications.

D. Technology and society: introducing technology- and engineering-related industries and occupations, reflecting on the interaction between technology and society. This enables students to explore the interactions of technology with people, society, the environment, and culture, while also understanding the possible social problems that may arise from poor technological products or facilities, thus cultivating good attitudes and values toward technology.

The following describes the learning content of the living technology curriculum:

Theme	Learning Content	
Nature of technology (N)	L-N-V-1	Relationship between technology and engineering: - The role of engineering techniques in the development of technology - Basic concepts of engineering design
	L-N-V-2	Integration and application of science, technology, engineering, and mathematics: - Role of scientific analysis, data simulation, and computation in the engineering design process
Design and production (P)	L-P-V-1	Engineering design and hands-on activities: - Principles of problem definition and solution development - Methods of predictive analysis - Model/prototype production - Testing, refinement, and optimization
Application of technology (A)	L-A-V-1	Design and application of mechanisms and structures: - Simulation and analysis of mechanism and structures - Real-life applications of mechanisms and structures
	L-A-V-2	Design and application of mechatronics and control: - Basic conceptual knowledge of mechatronics - Real-life applications of mechatronics and control
Technology and society (S)	L-S-V-1	Reflecting on the interactions of technology with society. - Introduction to technology- and engineering-related industries and occupations - Inquiry and reflection on scientific, engineering, and social issues

VI. Implementation Directions

1. Curriculum Development

(1) The domain of technology should emphasize both living technology and information technology. It should focus on the horizontal integration of technology with science, mathematics, and social studies, as well as the vertical articulation with national high schools.

(2) The curriculum of living technology should focus on engineering-oriented design and production. It should emphasize the provision of interdisciplinary knowledge integration learning (i.e. science, technology, engineering, art, and mathematics) for students through project production activities in engineering design. This course aims to cultivate high-level thinking skills such as design, innovation, and critical thinking.

(3) The curriculum of information technology focuses on computational thinking. Through the learning of computer science-related skills, students should develop computational thinking such as logical thinking and systematic thinking, as well as knowledge of technology applications and Internet resource services. In addition, students should also develop the ability to apply computational thinking, problem-solving skills, teamwork, and innovative thinking through the design and implementation of information technology. Furthermore, students should gradually explore computer science to understand the principles of computational thinking and be able to further integrate its application.

(4) To enrich the learning in the domain technology and include regional concern and international perspectives, curriculum development should focus on student experience and select life-oriented teaching materials. In addition, it should contain basic concepts of each issue and its substantive content at different learning stages. By linking the content of domains or subjects, the curriculum should be developed in a sequence of problem awareness, knowledge understanding, skill acquisition, and practical action.

(5) The curriculum development of this domain can consider the introduction of industry participation to keep up with the latest trends in technological development and inspire future innovative technological thinking.

2. Teaching Material Selection and Composition

(1) The selection and composition of teaching material should be in line with the concepts, curriculum objectives, and learning focus of technology domain. Moreover, it should be appropriate to the cognitive abilities and physical and mental development of students.

(2) The selection and composition of teaching material should be coherent. If there is a sequential relationship, it should be introduced gradually. The content of teaching material should also be contemporary and forward-looking.

(3) The examples, explanations, and teaching activities in teaching materials should be designed to match students' daily lives and learning experiences. It should be both interesting and challenging.

(4) The text, images, and materials used in teaching material should emphasize gender quality, cultural differences, and respect for human rights. The presentation of teaching material should pay attention to the power structures relationship between gender, ethnic group, and class in society, and protect gender rights.

(5) The description of the text in teaching materials should be vivid and easy to understand and avoid using excessive technical terms.

(6) To enhance the breadth of technology learning, the selection and composition of teaching material should appropriately incorporate materials on various issues. In addition, teaching material should guide students to analyze, speculate, and criticize the relationship between people, technology, society, and the environment.

(7) The selection and composition of teaching material in schools with special indigenous focuses is encouraged to appropriately combine with local indigenous cultures and tribal life experiences for culturally responsive teaching.

3. Teaching Implementation

(1) Technology should be instructed with an approach to problem-solving or project production. Students are encouraged to carry out autonomous and exploratory learning to implement the curriculum concepts of "design thinking" and "computational thinking". The practical hours should account for half to two-thirds of the total course hours.

(2) The living technology practical activities should comply with the following principles:

A. The emphasis should be placed on hands-on activities. Teachers should guide students to apply the engineering design process in project planning and execution to enhance their ability in solving practical problems.

B. Teachers should guide students to apply their engineering design and technological innovation skills and propose innovative and feasible design ideas for the structure or function of technological products.

C. Project practices should focus on engineering design and horizontally link with knowledge related to science, art, and mathematics.

D. Complemented by a series of practical or experimental units, teachers should guide students to apply their knowledge of science, technology, engineering, art, and mathematics to analyze the feasibility of design solutions, to predict, inquire, or solve possible problems in the engineering design and production process.

E. Teachers should guide students to properly use tools and equipment for material handling, and further solve problems during the hands-on process.

F. Teachers must guide students to reflect on and improve engineering design process. Moreover, they should also explore their interest in the engineering domain from this practice.

(3) For the algorithms and programming in information technology, teachers should teach students to use algorithms to analyze and design problem-solving methods and use programming to implement problem-solving programs. The two are interrelated and should be not taught separately. The curriculum should include examples related to students' daily life and learning to stimulate students' interest in learning algorithms and programming to solve problems.

(4) The setting of unit learning objectives and the arrangement of learning activities should emphasize students' differences. Teachers should guide students to use both hands and brains and consider the balanced development of cognition, affection, skills, and integration ability.

(5) The teaching process may be complemented by off-campus visits and other teaching activities as appropriate.

(6) Teachers should confirm that the school can provide the software and hardware equipment required for teaching before the start of each semester, and confirm their safety and legality.

(7) For students with physical and mental disabilities or other special needs, teachers should coordinate with schools or social welfare units to provide appropriate technological aids.

(8) The teaching content should be linked horizontally with other learning domains to facilitate the implementation of collaborative teaching.

(9) Teachers should continue to follow up on the current development of technology-related departments in colleges and universities and relevant careers in the technology industry to capture new technological knowledge and teaching ideas.

(10) Teachers should have gender-equal awareness while using teaching materials and engaging in educational activities. They should eliminate gender stereotypes, avoid gender bias and discrimination, and encourage students to pursue non-traditionally gender-specific subjects.

4. Teaching Resources

(1) Schools should procure appropriate hand tools, electric machines, desktop machines, or other emerging machines and equipment according to the basic facility standards of living technology. Moreover, schools should plan appropriate spaces to facilitate teaching.

(2) Schools should procure appropriate hardware and software equipment (computers, application software, emerging technology tools, platforms, etc.) or use free software for teaching based on the teaching needs of information technology teachers.

(3) Schools should appropriately plan the placement and set up of equipment, tools, machines, and the other facilities in the living technology and information technology special classrooms. In addition, there should be safety protection and emergency measures. Teachers should specially instruct students on the use of equipment, operational safety, and proper management when tools, machines, and equipment need to be used.

(4) Schools should regularly replenish learning resources related to student learning activities (i.e. relevant books, journals, magazines, multimedia audio-visual materials, etc.).

5. Learning Assessment

(1) The learning focus of technology covers the categories of technological knowledge, technological attitudes, operational skills, and integration ability. Therefore, the learning assessment should cover these four categories and integrate the curriculum concept and learning focus of “do, use, and think”. Furthermore, there should be both formative and summative assessments and the individual differences of students should be taken into account.

(2) The assessment of technological knowledge should cover different aspects of cognition. The assessment designs aim to be flexible, creative, contextualized, and diverse. In addition,

teachers should use open-ended questions to train students' thinking skills to the greatest extent.

(3) The assessment of technology attitudes should cover different aspects of interest and attitude. It should be done through teacher interviews, student self-assessment, and peer assessment.

(4) The assessment of operational skills should cover different skill levels. It should be done through practical or portfolio assessment. Moreover, teachers should also examine the improvement of students' daily performances and behavioral habits.

(5) The assessment of integration ability should cover design, innovation, problem-solving, teamwork, critical thinking, etc. It should be done through practical assignments, interviews, self-assessment, peer assessment, and portfolio assessment.

(6) In addition to covering the aforementioned categories, technology assessments should also guide students to self-reflect and improve their learning to develop metacognitive skills.

(7) Technology teachers should refer to students’ assessment results and make adjustments in the selection and composition of teaching material, teaching implementation, and classroom management.