# Information and Communication Technology Syllabus

## Grade 9

**To be implemented from 2018**

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**Information and Communication Technology (ICT)**
**Grade 09 –Syllabus**

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# 1. Introduction

The Information and Communication Technology sector is acknowledged worldwide as a tool that could be used to increase the productivity, efficiency and effectiveness of work. However, in Sri Lanka, the level of ICT skills of the majority of the students is not adequate to meet the current requirements of business and industry. This is mainly due to lack of opportunities for students to study ICT related subjects in the school curriculum. The student should learn at school a wide variety of competencies for different needs of life in the changing world. They should have various views and different ways to continue studies and proceed to employment.

At present ICT is taught as a subject at G.C.E. (O/L) in a limited number of schools and at G.C.E. (A/L) in even less number of schools in Sri Lanka. In this situation students officially start to learn ICT at Grade 10 and as a result a heavy load of subject matter has to be included in ICT at G.C.E. (O/L). Distribution of ICT subject matter over lower Grades will definitely reduce this load and provide students with opportunity to learn ICT at early stages of school life. Therefore it has been decided to implement ICT as a subject from Grade 6 onward.

The time allocated for ICT at Grade 9 is limited to 30 Periods (40 minutes per Period) per year only. During this period, learning is more focused on practical aspects of the subject with an appropriate amount of theoretical content. This is a continuation of the Grade 8 ICT curriculum. More emphasis is continued to be placed on programming concept and inclusion of simple programming of hardware devices is also introduced at Grade 9. Competencies of the use of software for simple statistical analysis and data representations are also presented in this curriculum. Students are expected to build ICT concepts through interaction with hardware and software of ICT.

# 2. National Goals

1. Based on the concept of respecting human values and understanding the differences between the Sri Lankan multi-cultural society, building up the nation and confirming the identity of Sri Lanka by promoting national integrity, national unity, national coherence and peace

2. While responding to the challenges of the dynamic world, identifying and conserving the national heritage.

3. Creating an environment which comprises of the conventions of social justice and the democratic life to promote the characteristics of respecting the human rights, being aware of the responsibilities, concerning each other with affectionate relationships.

4. Promoting a sustainable life style based on the people's mental and physical well-being and the concept of human values

5. Promoting the positive feelings needed for balanced personality with the qualities of creative skills, initiative, critical thinking and being responsible

6. Through education, developing the human resources, needed for the progress of the well-being of an individual, the nation as well as the economic growth of Sri Lanka.

7. Preparing the people for the changes that occur in a rapidly changing world by adapting to it and controlling them; developing abilities and potentialities of people to face the complex and unexpected occasions.

8. Sustaining the skills and attitudes based on justice, equality, mutual respect which is essential to achieve a respectable place in the international community.

*National Education Commission Report (2003)*

# 3. Basic Competencies

The competencies promoted though the education mentioned below might help to achieve the above mentioned National Goals.

**(i.)** **Competencies in Communication**

This set of competencies is made up of four subsets - Literacy, Numeracy, Graphics and Information & Communication Technology skills:

**Literacy** : Carefully listening, speaking clearly, and reading for comprehension, writing clearly and accurately.

**Numeracy** : Using numbers to count, calculate, code and to measure, matter, space and time.

**Graphics** : Making sense of line and form, expressing and recording essential data, instructions and ideas with line, form, color, two and three-dimensional configurations, graphic symbols and icons

**ICT Competencies**: Knowledge on computers, and the ability to use the ICT skills at learning or work as well as in the private life

**(ii.)** **Competencies relating to the Personality Development**

- Generic skills such as creativity, divergent thinking, initiative, decision making, problem-solving, critical and analytical thinking, team work, inter-personal relationships, discovering and exploring
- Values such as integrity, tolerance and respect for human dignity.
- Cognition

**(iii.)** **Competencies relating to the Environment.**

This set of competencies relates to the Social, Biological and Physical Environments.

**Social Environment**: Awareness, sensitivity and skills linked to being a member of society, social relationship, personal conduct, general and legal conventions, rights, responsibilities, duties and obligations.

**Biological Environment**: Awareness, sensitivity and skills linked to the living world, man and the ecosystem, the trees, forests, seas, water, air and life - plant, animal and human life.

**Physical Environment**: Awareness, sensitivity and skills relating to space, energy, fuels, matter, materials and their links with human living, food, clothing, shelter, health, comfort,  respiration, sleep, relaxation, rest, wastes and excretion, media of  communication and transport.
*Included here are the skills in using tools to shape and for materials for living and learning*.

**(iv.)** **Competencies relating to preparation for the world of work**

Employment related skills to maximize their potential and to enhance their capacity to contribute to economic development; to discover their vocational interests and aptitudes; to choose a job that suits their abilities and; to engage in a rewarding and sustainable livelihood

**(v.)** **Competencies relating to religion and ethics**

This set of competencies deals with values and attitudes. It is essential for individuals to assimilate values, so that they may function in a manner consistent with the ethical, moral and religious modes of conduct, rituals, practices in everyday living, selecting the most appropriate.

**(vi.)** **Competencies in play and use of leisure**

Competencies that link up with pleasure, joy, emotions and such human motivations.  These find expression in play, sports, athletics and leisure pursuit of many types.  These also link up with such values as cooperation, team work, healthy competition in life and work. Here are included such activities as are involved in aesthetics, arts, drama, literature, exploratory research and other creative modes in human living

**(vii.)** **Competencies relating to 'Learning to Learn'.**

These competencies flow directly from the nature of a rapidly changing, complex and interdependent   and crowded world. Whatever one learns, that learning will need updating and review. This requires that one should be aware of, sensitive and skillful in sustained attention, and be willing to persevere and attend to details that matter in a given situation.

# 4. Aims of the Information and Communication Technology (ICT) Curriculum

Such a surge in the growth, development and the application of Information Communication Technology as today has never been experienced before. The importance and relevance of ICT to almost all walks of life today has made it all the more important that knowledge and expertise, both practical and theoretical, of its application, should begin at the very grass roots level of education.

Aims to be achieved by the course are as follows:

- Develop skills useful to access ICT resources.
- Develop skills in the use of software for data analysis.
- Develop concepts in programming.
- Inculcate basic good practices in the use of ICT resources
- Develop a sound base for further pursuit of Information Technology and Communication Technology studies.

## 5. How the national goals are addressed in the curriculum

| National Goals | Curriculum Aims | Curriculum Objectives (competencies) |
|---|---|---|
| Promoting the positive feelings needed for balanced personality with the qualities of creative skills, initiative, critical thinking and being responsible | Develop skills useful to access ICT resources.<br>Develop concepts in programming. | • Prepares specifications for purchasing of a computer and peripherals (1)<br>• Uses flow charts to solve simple programs with sequence selection and iteration. (3)<br>• Uses programming language to develop simple programs. (4) |
| Through education, developing the human resources, needed for the progress of the wellbeing of an individual, the nation as well as the economic growth of Sri Lanka. | Develop skills in the use of software for data analysis | Uses spreadsheet software for simple analysis of data (2) |
| Preparing the people for the changes that occur in a rapidly changing world by adapting to it and controlling them; developing abilities and potentialities of people to face the complex and unexpected occasions. | • Inculcate basic good practices in the use of ICT resources<br>• Develop a sound base for further pursuit of Information Technology and Communication Technology studies. | • Improves skills in Physical Computing(5)<br>• Uses Advance technique of the Internet using Boolean conditions. (6)<br>• Uses Advance technique of the Internet using Boolean conditions. (7)<br>• Explores the new trends in ICT (8) |

| Competency | Competency Level | Contents | Learning Outcomes | Duration/ Periods |
|---|---|---|---|---|
| 1. Prepares specifications for purchasing a computer and peripherals | 1.1 Identifies user needs for a computer and its peripherals | • Specification of computer components and their meaning to users | i. Describes the basic specifications of computer and its peripherals | 01 |
| | 1.2 Translates user requirements to computer and its peripherals | • Basic Specifications of computer and its peripherals <br> o Processor types and speed <br> o Hard disk capacity <br> o Monitor specifications <br> o RAM specifications <br> o VGA and sound <br> • Warranty <br> • Included software <br> • After sale services | i. Identifies the user requirements in terms of technical specifications. <br> ii. Determines the required technical specification | 01 |
| 2. Uses spreadsheet software for calculations and for simple analysis of data | 2.1 Describes basics of spreadsheet software | • Introduction to spreadsheet application software IDE <br> • Work Book, Worksheet <br> • Inserting, renaming and deleting worksheet <br> • Cell Addressing | i. Uses IDE of spreadsheets software <br> ii. Uses Cell Addressing | 01 |
| | 2.2 Enters data in worksheet | • Changing column width and row height <br> • Formatting Cells: <br> o Text alignment, Font, Border, Fill <br> • Data types : Value, number, Currency, Date and Time <br> • Saving a work book | i. Determines required column width and row height <br> ii. Formats cells <br> iii. Explains Cell Formatting <br> iv. Creates work book and Save | 02 |

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|---|---|---|---|---|
| | 2.3 Carries out Simple mathematical calculations | • Use of mathematical operators<br>o Addition<br>o Subtraction<br>o Multiplication<br>o Division | i. Identifies mathematical operators<br>ii. Uses operators correctly | 01 |
| | 2.4 Uses Functions to carry out Simple mathematical calculations and data sorting | • Basic Function used in spreadsheets SUM, AVERAGE, MAX, MIN, COUNT, COUNTA<br>• Data sorting | i. Identifies functions and its parameters for required task<br>ii. Applies spread sheet software tools to carry out the task<br>iii. Applies spread sheet software for data sorting | 01 |
| | 2.5 Uses various charts to display data | • Basic Chart types: Column Chart, Bar Chart, Line Chart, Pie Chart<br>• Chart options: Change of chart type, formatting Legend, Formatting data series and axles, Switching row and column | i. Identifies the relevant chart types<br>ii. Creates the chart using relevant tools<br>iii. Creates and format the suitable chart for the relevant data | 01 |
| 3. Uses flow charts to solve simple problem with Sequence Selection, Iteration and develop programs (using Scratch) | 3.1 Uses Sequence, Selection and Iteration control structure for drawing flow charts | • Problem solving using multiple Selections<br>• Problem solving using Iterations<br>• Problem solving using nested Iterations | i. Draws flow charts to solve simple problems<br>ii. Identifies the problem and decide solution | 02 |
| | 3.2 Uses Selection and Iteration (Repetition) control structures for solving simple problems with visual | • Selection control structures with multiple conditions<br>• Control structure with simple iteration<br>• Development of simple programs (sequence, selection and iteration) using visual supports | i. Applies multiple conditions in selection control structure<br>ii. Identifies the | 05 |

| | | | difference between selection and iteration<br>iii. Uses iteration control structure to solve relevant problems | |
|---|---|---|---|---|
| | 3.3 Develops programs with visual support with nested iterations | • Development of programs using basic iteration control structure: Repeat<br>• Development of visual program with selection & iteration and nested iteration control structure | i. Creates animated program using repetition control<br>ii. Explains the different usage of repetition structures | 03 |
| | 3.4 Develops programs with array variables | • Declaration of array variable<br>• Appling of array variables to solve problems | i. Describes the use of array variables<br>ii. Uses array variables in programs to solve simple problems | 02 |
| | 3.5 Evaluates the solution to ensure that it properly satisfies the problem | • Proper decomposition of the problem<br>• Ensuring all aspects are covered in decomposition<br>• Designing and writing a program with correct decomposition | i. Evaluates whether the solution to ensure the problem is created accurately and efficiently | 01 |
| 4. Improves skills in Physical Computing | 4.1 Programs simple digital systems (Micro controller based kit) | • Development of programs for detecting the inputs from sensors<br>• Development of programs for controlling actuators | i. Develops programs for detecting the inputs from sensors<br>ii. Develops programs for controlling actuators of simple sense detector | 05 |

| 5. Investigates computer network for communication and resource sharing | 5.1 Explores the main components of the network in the school computer lab | • Main components of computer network (Computers, Network Interface Card (NIC), Switches and etc.) | i. Describes main components of the computer network | 01 |
|---|---|---|---|---|
| | 5.2 Utilizes computer network in resource sharing and communication | • Sending messages through a computer network<br>• Sharing resources (Software, Folder, File, CD Drive, Printer etc.) | i. Sends messages through computer network<br>ii. Shares the resources though a computer network | 01 |
| 6. Explores the impact of ICT on society and career opportunities | 6.1 Describes impact of ICT on society | Applications of ICT<br>• Office automation<br>• e-Learning<br>• e-Commerce, m-Commerce<br>• e-Health<br>• e-Government<br>• Digital Divide<br>• Safe disposal of electronic waste | i. Describes the benefits in use of ICT in society<br>ii. Describes the negative aspects arise in using ICT | 01 |
| | 6.2 Explains career opportunities in computing | • Career Opportunities<br>  o Software Quality Assurance Engineer<br>  o Software Engineer<br>  o Database Administrator<br>  o Software Architect<br>  o Programmer<br>  o System Analyst<br>  o Web Application Developer<br>  o Graphic Designer<br>  o Network Administrator<br>  o Business Analyst | i. Explains the career opportunities in the present society<br>ii. Explains the job role of different careers in computing | 01 |
| | | | Total | 30 |