Information and Communication Technology

Grade

10

Teacher's guide
To be implemented from 2015

Department of Information Technology
Maharagama
Sri Lanka
www.nie.lk

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Teachers' Guide

First Print

Message from the Director General

The first phase of the new competency based curriculum, with 8 years curriculum cycle was introduced to secondary education in Sri Lanka in 2007 replacing the existed content based education system with basic objective of developing the national level competencies recommended by the National Education Commission.

The second phase of the curriculum cycle to be introduced to grades 6 and 10 starts from 2015. For this purpose, National Institute of Education has introduced a rationalization process and developed rationalized syllabi for these grades using research based outcomes and various suggestions made by different stakeholders.

In the rationalization process, vertical integration has been used to systematically develop the competency levels in all subjects from fundamentals to advanced levels using the bottom up approach. Horizontal integration is used to minimize the overlapping in the subject content and to reduce the content over loading in the subjects to produce more students friendly and implementable curricular.

A new format has been introduced to the teachers' guide with the aim of providing the teachers with the required guidance in the areas of lesson planning, teaching, carrying out activities and measurement and evaluation. These guidelines will help the teachers to be more productive and effective in the classroom.

The new teachers' guides provide freedom to the teachers in selecting quality inputs and additional activities to develop the competencies of the students. The new teachers' guides are not loaded with subject content that is covered in the recommended textbooks. Therefore, it is essential for the teacher to use the new teachers' guides simultaneously with the relevant textbooks prepared by Education Publication Department as reference guides to be more aware of the syllabi.

The basic objectives of the rationalized syllabi and the new format of teachers' guide and newly developed textbooks are to bring a shift from the teacher centered education system into a student centered and more activity based education system in order to develop the competencies and skills of the school leavers and to enable the system to produce suitable human resource to the world of work.

I would like to take this opportunity to thank the members of Academic Affairs Board and Council of National Institute of Education and all the resource persons who have immensely contributed in developing these new teacher guides.

Director General

National Institute of Education

Message from the Deputy Director General

Education from the past has been constantly changing and forging forward. In recent years, these changes have become quite rapid. Past two decades have witnessed a high surge in teaching methodologies as well as in the use of technological tools and in the field of knowledge creation.

Accordingly, the National Institute of Education is in the process or taking appropriate and timely steps with regard to the education reforms of 2015.

It is with immense pleasure that this Teachers' Guide where the new curriculum has been planned based on a thorough study of the changes that have taken place in the global context adopted in terms of local needs based on a student-centered learning-teaching approach, is presented to you teachers who serve as the pilots of the schools system.

An instructional manual of this nature is provided to you with the confidence that, you will be able to make a greater contribution using this.

There is no doubt whatsoever that this Teachers' Guide will provide substantial support in the classroom teaching-learning process at the same time. Furthermore the teacher will have a better control of the classroom with a constructive approach in selecting modern resource materials and following guide lines given in this book.

I trust that through the careful study of this Teachers Guide provided to you, you will act with commitment in the generation of a greatly creative set of students capable of helping Sri Lanka move socially as well as economically forward.

This Teachers' Guide is the outcome of the expertise and unflagging commitment of a team of subject teachers and academics in the field Education.

While expressing my sincere appreciation of this task performed for the development of the education system, my heartfelt thanks go to all of you who contributed your knowledge and skills in making this document such a landmark in the field.

M.F.S.P. Jayawardhana
Deputy Director General
Faculty of Science and Technology

Curriculum Revision Committee

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Instructions for use of the Teacher's Guide

This Teacher's Guide covers all competency levels of the Grade 10 ICT syllabus and is designed as relevant to the learning- teaching process. In addition to the competency levels and subject matter, some more related concepts and terms have also been highlighted. The objective is to provide the user with more in depth understanding of the syllabus. The guidance for leeson plans may be modified by the teacher to suit the relevant context. The assessment and evaluation guidance may also be modified according to the needs of the situation. Quality inputs mentioned in this case are specified websites and e-learnig material included in the DVD that accompanies this Teracher's Guide. These are meant for the use of both teachers and students and could be integrated in their learning –teaching process to their convenience.

Guidance is provided for the preparation of lab-sheets and it is very important to involve students in laboratory practicals as it provides them with better understanding of the subject matter and could lead them to develop skills necessary to ensure a better place in the world of work that demands ICT applications.

For laboratory practicals following items of software are recommended and they are also included in the DVD.

Operating Systems – a flavour of Linux

Office applications – a flavour of Open Office

Information and Communication Technology

Syllabus

Grade 10

To be implemented from 2015

Department of Information Technology
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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.

Since Sri Lanka is in the early stages of introducing ICT to the lower grades, the present syllabus does not demand any ICT knowledge as an entry requirement. Therefore, this syllabus is intended to introduce ICT as a technical subject to be offered at the G.C.E (O/L) Examination. The main objective of this syllabus is to develop the competencies to use ICT tools and to build a basic theoretical base for students to pursue higher studies in ICT.

The curriculum that was implemented in 2006 (Grade 10) has now been revised based on the evidence of a survey conducted, advice of the veterans in this discipline and developments in the field of ICT. The syllabus of Grade 10 has not undergone much revision but certain content that was best advised to be removed or toned down to alleviate cognitive burden of the target group. Subject matter on databases was streamlined to provide students with better view and involvement as this has more than a mere academic value and add values to the life-skills of students.

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 first set of competencies is made up of four subsets - Literacy, Numeracy, Graphics and information communication skills :

Literacy : Carefully listening, Speaking clearly, 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, colour, two and three-dimensional configurations, graphic symbols and icons

ICT Competencies: Knowledge on computers, and the ability to use the information communication 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 is the second set of competencies related 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 fourth set of competencies laden 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 skilful 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 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:

- Inculcate basic computer literacy and develop a base for further pursuit of Information Technology and Communication Technology studies.
- Develop understanding of use and resultant outcomes of use of different types of ICT applications.
- Develop concepts and principles related to ICT.
- Improve skills required for the development of ICT based solutions for real world problems.
- Provide awareness of benefits and problems of ICT use to participants

5. Syllabus of G.C.E. (O/L) ICT: Grade 10

Subject Content and Time Duration by Competencies and Competency Levels

Competency	Competency Level	Content	Learning Outcomes	Periods
1 Investigates the place of the computer in the world of information.	**1.1 Investigates the contribution of ICT towards national development**	• Definition of ICT • Application of ICT in the society o e-government, agriculture, education, health, industry, entertainment	• Explains the nature of ICT • Elaborates the uses of ICT in various fields of work	3
	1.2 Investigates the computer as a system for converting data into information.	• Components of a system • Difference between data and information • Data as input and information as output • Processing as the method for converting data into information	• Describes various systems in day to day life • Elaborates functions of an information system in terms of its main components.	2

Competency	Competency Level	Content	Learning Outcomes	Periods

	1.3 **Explores the evolution of computers to identify its major developments**	• Computer generations
		• Evolution of processor technology
		   o Vacuum tubes
		   o Transistors
		   o Integrated circuits: LSIC,VLIC
		• Improvements in system characteristics
		   o Size
		   o Capacity
		   o Speed
		   o Accuracy
		   o Efficiency
			• Explains landmarks in the evolution of computers
			• Discusses the enhancement in system characteristics with the evolution.
				2

2. **Selects and uses computer hardware.**	2.1 **Classifies computers using a variety of methods.**	• Computer classifications
		   o Main frame, Mini, Micro, Super
		   o Digital, analog and hybrid
			• Briefly explains the features of different classes of computers	2

	2.2 **Explores computer systems by function.**	• Functions of a computer and its peripherals
		   o Input
		   o Processing
		   o Output
		   o Storage
		   o Communication
			• Identifies components of a computer system
			• Describes functions of each components
				3

Competency	Competency Level	Content	Learning Outcomes	Periods

	2.3 **Identifies and connects basic peripherals to the computer.**	• Basic computer components: keyboard, mouse, system unit and monitor
		• Ports
		  o PS/2 port
		  o Serial port
		  o Parallel port
		  o USB port
		  o RJ 45
		  o Video port
			• Describes main physical components of a computer
			• Describes functions of ports of a computer
				2

	2.4 **Uses the basic block diagram to demonstrate the computer system**	• ALU and Control Unit
		• Flow path
		  o Data and instruction signals
		  o Control signals
			• Explains the functions of basic components.
			• Explains the flow of signals in the computer system.
				1

	2.5 **Investigates benefits and concerns of computer networks for optimal communication.**	• Purpose of computer networks
		  o Data communication
		  o Resource sharing
		• Components of a network
		  o Network Interface Card
		  o Internal and external devices
			• Explains the purpose of networking
			• Describes physical layout of a network
			• Discusses the issues in networking.
				3

Competency	Competency Level	Content	Learning Outcomes	Periods

		o Transmission media: guided and unguided
		o Network cables: twisted pair, co-axial, fiber optics
		o Modem, hub, switch, router
		• Network operating system
		• Types of computer networks
		  o LAN
		  o MAN
		  o WAN
		• Advantages and disadvantages of networks		

3. Investigates the methods used to represent data in computer systems.	3.1. Uses the binary number system to represent data in computer systems.	• Methods of data representations o 1 and 0 to represent two states • Binary number system	• Explains that data can be represented using two states • Represents positive decimal integers in binary	2
	3.2. Converts decimal numbers to Binary, Octal and Hexa Decimal	• Number systems: Decimal, Binary, Octal, Hexa Decimal • Methods for number systems conversions	• Describes number systems with 8 and 16 as the bases • Computes position values of the numbers converted in each system.	2

Competency	Competency Level	Content	Learning Outcomes	Periods

	3.3. Converts Binary numbers to Decimal, Octal and Hexa Decimal numbers and vice versa	• Methods for conversions (positive integers only)
		  o Binary to Decimal
		  o Binary to Octal
		  o Binary to Hexa Decimal
			• Converts binary integers to decimals and vice versa
			• Converts binary integers to octals and vice versa
			• Converts binary integers to hexa decimal and vice versa
			• Converts octal integers to hexa decimal and vice versa
				3

	3.4. Determines the capacity of data storage	• Units of measurement: Bit, Byte, Kilo Byte, Mega Byte, Giga Byte, Tera Byte • Order of capacities of different storage devices: Cache, RAM, ROM, hard disk, compact disk, USB drives	• Describes storage units in terms of bytes • Compares capacity of various storage devices	2
	3.5. Explores coding systems in computers	• BCD • EBCDIC • ASCII • Unicode	• Explains how different coding systems are used • Explains limitations of each system	1

Competency	Competency Level	Content	Learning Outcomes	Periods
4. **Uses Boolean logic to work effectively with logic gates**	**4.1. Identifies basic logic operators and draws truth tables to illustrate their functions**	• Operators: AND, OR, NOR, NAND,NOT • Introduction to Truth Tables (maximum of three inputs)	• Explains the action of logic gates • Draws truth tables for logic operations	2

	4.2. Applies concepts of Boolean logic to find solutions to simple day-to-day life problems.	• Design of logic for simple real world applications.
		  o Alarm systems
		  o Selection criteria
			• Draws block diagrams of systems using Boolean logic
			• Draws block diagrams to represent solutions to simple problems involving Boolean logic
			• Converts block diagrams into logic diagrams
				2

5. **Works effectively with Operating Systems**	**5.1. Explores operating systems by type, functions, benefits and concerns.**	• Introduction to OS
		• Evolution of computer/human interface
		• Types of operating systems: single user, multi user, multi tasking, real time, distributed
		• Functions of the OS: user interface and resource management
		  o Benefits of the OS
		  o Utilities of an OS: Partitioning,
		  o Formatting, Defragmentation
			• Describes the need of an operating system
			• Explains functions of an operating system
			• Explains utilities of an operating system
				2

Competency	Competency Level	Content	Learning Outcomes	Periods

	5.2. Handles files and folders in Operating Systems	• Introduction to the files system
		  o Drives
		  o Folders
		  o Files and file extensions
		  o File and folder operations
			• Carries out following operations: creation, deletion, renaming, copying
			• Organizes documents into folders according to needs
				4

6. Uses Wordprocessing Software to Solve Day-to-day problems	6.1. Explores the concept and features of wordprocessing	• Functions of wordprocessing software • GUI of wordprocessing software	• Discusses facilities of wordprocessing software • Explores GUI of wordprocessing software	2
	6.2. Performs basic tasks in wordprocessing software	• Creating new documents • Opening existing documents • Saving and closing of documents	• Creates new documents • Opens existing documents • Saves and closes documents	3
	6.3. Uses different types of formatting in wordprocessing	• Formatting text • Graphics: Insertion and formatting • Shapes : Insertion and formatting	• Applies suitable text formatting • Manipulates graphics and draws simple shapes	3
	6.4. Manipulates table feature in wordprocessing software	• Insertion of tables • Column width and height • Deletion, insertion, splitting and merging of cells	• Creates tables to insert data • Formats tables • Edits tables	2

Competency	Competency Level	Content	Learning Outcomes	Periods
	6.5. Creates and prints documents	• Spelling and grammar checking • Find and replace of text • Page setup: paper size, margins, orientation and selection of printers • Print options: copies and page range.	• Checks spelling and grammar of a document • Prints documents with necessary settings	2

	6.6. Uses the Mail Merge facility	• Document types
		  o Common document
		  o Source data
			• Creates template document
			• Creates data tables
			• Merges data with template
				3

7. **Uses Spreadsheet to solve simple statistical problems**	**7.1. Explores a Spreadsheet to identify its basic features and functions.**	• Introduction spreadsheets • GUI of spreadsheet software	• Lists functions of an electronic spreadsheet • Identifies features of GUI of spreadsheet software	2
	7.2. Moves around the worksheet to gain hands on experience of data entry	• Worksheet, columns, rows and cells • Moving around worksheet. • Data entry (label, number, formulae)	• Identifies components of a worksheet • Enters and edits data	2

Competency	Competency Level	Content	Learning Outcomes	Periods
	7.3. Performs basic mathematical operations	• Simple calculations using values and operators (+, -, *, /,^) • Simple calculations using cell addresses and operators (+, -, *, /,^)	• Carries out calculations using basic operators • Uses cell references in calculations.	2
	7.4. Uses inbuilt functions for calculations	• SUM, AVERAGE, MAX, MIN, COUNT	• Identifies functions and its parameters • Uses basic built-in functions in calculations	2
	7.5. Formats a worksheet	• Font, Font size, Boldface, Italic etc. • Alignment (centre, left, right, justify) • Decimal places (increase and decrease)	• Formats and aligns data in cells • Sets decimal places according to requirements	2
	7.6. Uses relative versus absolute cell references appropriately.	• Absolute and Relative cell references.	• Explains relative and absolute addressing modes • Uses both modes appropriately in calculations	2
	7.7. Creates charts using Spreadsheet to explain data	• Charts: chart type, chart options • Chart types: Bar, column, line and pie	• Identifies the relevant chart type • Present data using suitable built in chart types	2

Competency	Competency Level	Content	Learning Outcomes	Periods
8. Uses Presentation software to develop electronic presentations.	**8.1. Produces effective presentations integrating multimedia.**	• Introduction to presentation software • Changing Background, Slide layout, Slide designs. • Inserting text and multi media	• Applies good practices in the use of presentation software • Formats slide layout • Inserts text, images, movies and sounds	3
	8.2. Applies suitable animations to enhance the quality of presentations.	• Slide transitions • Custom animation	• Applies suitable screen transitions • Applies suitable animations on screen objects	3
9. Develops simple databases to elicit information.	**9.1. Explores the Concept of Database**	• Introduction to databases • Definition of a database • Advantages of databases. • Features of databases: Absence of redundancy, Efficiency, Accuracy, Consistency, Security, Validity, Simplicity, integrity • Manual and electronic databases:	• Discusses nature and advantages of databases • Explains the features of relational databases	3

Competency	Competency Level	Content	Learning Outcomes	Periods
		• comparison and contrast • Introduction to Relational Databases: Tables, records, fields, key fields		
	9.2. Creates a simple database with a single table, manually.	• Field name, unique field, data types, field size	• Identifies the purpose of the database • Select suitable fields to create data tables	2
	9.3. Converts a manual database into electronic media.	• Field name, unique field, data types, field size	• Identifies the purpose of the database • Select suitable fields to create data tables	2
	9.4. Design a simple relational database.	• Tables, fields and key fields: Primary key, foreign key, relationships	• Designs simple relational databases manually • Identifies primary and foreign keys	2
	9.5. Uses DBMS software to create relational databases	• Creation of a database • Identification of primary and foreign key • Creation of relationship between tables	• Creates databases using DBMS software • Implements relationships	2
	9.6. Uses forms to view and update data	• Form design • Manipulation of properties of a form • Insertion of controls: Delete button	• Designs data input and editing forms • Inserts suitable controls to manipulate data	2

Competency	Competency Level	Content	Learning Outcomes	Periods
	9.7. Creates Queries to extract information	• Design of queries using query tool without using SQL structure • Use of criteria • Sorting of records	• Design queries to meet given criteria • Performs simple queries on the database	2
	9.8. Creates reports to present information	• Use of report Wizard • Printing of reports	• Creates reports for given purposes • Prints reports	2
			Total (Periods)	90

Contents

Competency: 1. Investigates the place of the computer in the world of information.
Competency Level: 1.1 Investigates the contribution of ICT towards national development
Time: 3 periods

Learning Outcomes:
- Explains the nature of ICT
- Elaborates the uses of ICT in various fields of work

Content:
- Definition of ICT
- Application of ICT in the society
  - e-government, agriculture, education, health, industry, entertainment

Concepts and terms need to be highlighted:
- Definition of ICT
- Brief introduction to fields in which ICT is used

Guidance for lesson plans:
Students are supposed to explore the use of ICT and participate in a classroom discussion.

Guidance for assessments and evaluations
Preparation of a booklet on the use of ICT in given fields

Quality inputs:
- **C1_1 included in the DVD**
- http://wwf.panda.org/about_our_earth/all_publications/ict/
- http://www.swedishwire.com/jobs/9402-sweden-the-worlds-most-ict-competitive-country-

Competency Level: 1.2 Investigates the computer as a system for converting data into information.

Time: 2 periods

Learning Outcomes:
- Describes various systems in day to day life.
- Elaborates functions of an information system in terms of its main components.

Content
- Components of a system
- Difference between data and information
- Data as input and information as output
- Processing as the method for converting data into information

Concepts and terms need to be highlighted:
- Ensure that students clearly identify data, processing and information.
- Ensure that students can distinguish between data and information. Clearly explain that if a given item has processed nature, that is more likely information.
- Stress that data and information are relative terms and they can be better identified with respect to a data processing system. Information in a certain sense could be data with respect to some other system.

Guidance for lesson plans:
Discussion with numerous examples.

Guidance for assessments and evaluations
1. Provide students with items and let them decide whether they are data or information.
2. Ask the logic behind their decisions
3. Provide any two items out of input, process and output and let students decide the missing part with reasoning

Quality inputs:

- **C1_2 included in the DVD**
- http://www.teach-ict.com/as_a2_ict_new/ocr/AS_G061/311_data_info_knowledge/data_info_knowledge/theory_data_info_know.html
- http://tutor2u.net/business/ict/intro_business_information.htm

Competency level: 1.3 Explores the evolution of computers to identify its major developments

Time: 2 periods

Learning Outcomes:
- Explains landmarks in the evolution of computers
- Discusses the enhancement in system characteristics with the evolution.

Content
- Computer generations
- Evolution of processor technology
  - Vacuum tubes
  - Transistors
  - Integrated circuits: LSIC,VLIC
- Improvements in system characteristics
  - Size
  - Capacity
  - Speed
  - Accuracy
  - Efficiency

Concepts and terms need to be highlighted:
Emphasize the improvement in the processor capacity and efficiency with respect to the evolution.

Guidance for lesson plans:
1. Design a group activity
2. Allow students to search information on the evolution and create a booklet
3. Get the students make presentations on their discoveries

Guidance for assessments and evaluations
Set MCQs covering the main points of this evolution

Quality inputs:

- **C1_3 included in the DVD**
- http://www.computerhistory.org/timeline/?category=cmptr
- http://www.slideshare.net/panitiaict/evolution-of-the-computers
- http://promo.aaas.org/kn_marketing/pdfs/EvoutionofComputers.pdf

Competency : 2.0 Selects and uses computer hardware**.**

Competency Level: 2.1 Classifies computers using a variety of methods.
Competency level: 2.2 Explores computer systems by function.

Time: 5 periods

Learning Outcomes:
- Identifies components of a computer system
- Describes functions of each components

Content
- Functions of a computer and its peripherals
  - Input
  - Processing
  - Output
  - Storage
  - Communication

Concepts and terms need to be highlighted:
- Description of peripherals with their functions (keyboard, mouse, touch screen, light pen, digitizer, microphone, webcam, OCR, MICR, monitor, printer, plotter, Computer Output on Microfilm, speaker).
- Selection of peripherals according requirements.
- Compare and contrast storage devices in terms of capacity, speed and relative position in the storage hierarchy

Guidance for lesson plans:
1. Physical display of peripherals
2. Use movies to describe functionality of uncommon peripherals
3. Use newspaper advertisements on specification of computer systems in the purchase of computers

Guidance for assessments and evaluations
Provide students with requirement specifications to purchase a computer and ask them to specify hardware for that purchase.

Quality inputs:

- **C2_1&2 included in the DVD**
- http://www.techopedia.com/definition/2344/input-device
- http://www.tutorialspoint.com/computer_fundamentals/computer_output_devices.htm
- http://www.macmillandictionary.com/thesaurus-category/british/Computer-memory-and-data-storage-devices

Competency level: 2.3 Identifies and connects basic peripherals to the computer.

Time: 2 periods

Learning Outcomes:

- Describes main physical components of a computer
- Describes functions of ports of a computer

Content
- Basic computer components: keyboard, mouse, system unit and monitor
- Ports
    o PS/2 port
    o Serial port
    o Parallel port(obsolete)
    o USB port
    o RJ 45
    o Video port & HDMI, Audio(mic, speaker)

Concepts and terms need to be highlighted:
- Physical identification of the ports.
- Type of peripherals to be attached to each ports.

Guidance for lesson plans:
- Pair work
- Let each pair find out ports on the computer.
- Ask them to draw a diagram to show location of such ports.

Guidance for assessments and evaluations
    Matching exercise between peripheral devices and ports.

Quality inputs:

- **C2_3 included in the DVD**
- http://www.tutorialspoint.com/computer_fundamentals/computer_ports.htm
- http://computer.howstuffworks.com/pc2.htm
- http://computer.howstuffworks.com/usb.htm

Competency level: 2.4 Uses the basic block diagram to demonstrate the computer system

Time: 1 period

Learning Outcomes:
- Differentiate data and instruction signals from control signals
- Explains the flow of signals in the computer system.

Content
- Flow path
  - o Data and instruction signals
  - o Control signals

Concepts and terms need to be highlighted:
   Brief explanation on what data, instructions and controls are.

Guidance for lesson plans:
1. Discussion.
2. Use a motherboard to show the paths.
3. Use animations to explain the signal flow.

Guidance for assessments and evaluations
   MCQ test based on an animation of signal flows.

Quality inputs:

- **C2_4 included in the DVD**
- http://ecomputernotes.com/fundamental/introduction-to-computer
- http://computer.howstuffworks.com/inside-computer3.htm
- http://pcsupport.about.com/od/componentprofiles/p/p_mobo.htm

Competency level: 2.5 Investigates benefits and concerns of computer networks for optimal communication.

Time: 3 periods

Learning Outcomes:

- Explains the purpose of networking
- Describes physical layout of a network
- Discusses the issues in networking.

Content

- Purpose of computer networks
  - Data communication
  - Resource sharing
- Components of a network
  - Network Interface Card
  - Internal and external devices
  - Transmission media: guided and unguided
  - Network cables: twisted pair, co-axial, fiber optics
  - Modem, hub, switch, router
- Network operating system
  - Types of computer networks: LAN,MAN,WAN
- Advantages and disadvantages of networks

Concepts and terms need to be highlighted:

Enough real time examples of networks in various organizations: banks, supermarkets, administration.

Guidance for lesson plans:

1. Use network available in the computer lab to explain network characteristics of a LAN
2. Physical observation of a network of a institution.
3. Demonstrate with an animation.

Guidance for assessments and evaluations

Provide simple specifications of a LAN and ask students to draw a rough sketch of the LAN explaining components to be used.

Quality inputs:

- **C2_5 included in the DVD**
- http://compnetworking.about.com/od/basicnetworkingconcepts/a/how-computer-networks-work-introduction-to-devices.htm
- http://www.slideshare.net/makyong1/basic-concepts-of-computer-networks

Competency: 3.0 Investigates the methods used to represent data in computer systems.

Competency level: 3.1 Uses the binary number system to represent data in computer systems.

Time: 2 periods

Learning Outcomes:
- Explains that data can be represented using two states
- Represents decimal numbers in binary

Content
- Methods of data representations
  - o 1 and 0 to represent two states
- Binary number system

Concepts and terms need to be highlighted:
- Concept of two states.
- Various types of data: Text and numbers, images, audio.
- Representation of data in relevant media.

Guidance for lesson plans:
1. Explain the concept of two states with respect to digital data.
   a. Discuss various types of data: Text and numbers, Images, Audio
2. Discuss how they are represented in relevant media
3. Demonstrate using visuals how data is represented in various media.
4. Highlight the base 10 and base 2 use of representation of positive integers.

Guidance for assessments and evaluations
1. Ask student to make a list of types of analog and digital data used in various contexts.
2. Exercises on conversion of decimal positive integers to binary and vice-versa.

Quality inputs:

- **C3_1 included in the DVD**
- http://www.cse.mrt.ac.lk/~dilumb/docs/Navy/DCS201/02-Data%20Representation_view.pdf
- http://www.cambridgegcsecomputing.org/representation-of-data-in-computer-systems-main

Competency Level: 3.2 Converts decimal numbers to Binary, Octal and Hexa Decimal

Time: 2 periods

Learning Outcomes:
- Describes number systems with 8 and 16 as the bases
- Computes position values of the numbers converted in each system.

Content
- Number systems: Decimal, Binary, Octal, Hexa Decimal.
- Methods for number systems conversions.

Concepts and terms need to be highlighted:
- Focus only on positive integers.
- Examples of where these systems are used with reasons (RGB:Hexa Decimal).

Guidance for lesson plans:
Demonstration of conversions

Guidance for assessments and evaluations
Calculations on conversions

Quality inputs:

- **C3_2 included in the DVD**
- http://cs.stackexchange.com/questions/19963/why-hex-octal-or-hexadecimal-computers-use-binary-and-humans-decimals
- http://www.robotroom.com/NumberSystems4.html

Competency Level: 3.3 Converts Binary numbers to Decimal, Octal and Hexa Decimal numbers and vice versa

Time: 3 periods

Learning Outcomes:
- Converts binary integers to decimals and vice versa
- Converts binary integers to octals and vice versa
- Converts binary integers to hexa decimal and vice versa
- Converts octal integers to hexa decimal and vice versa

Content
- Methods for conversions (positive integers only)
  - Binary to Decimal
  - Binary to Octal
  - Binary to Hexa Decimal

Concepts and terms need to be highlighted:
- Conversions from octal-binary and vice versa
- Conversions from hexadecimal-binary and vice versa
- Conversions from hexadecimal-binary and vice versa
- Conversions from hexadecimal-octal and vice versa

Guidance for lesson plans:
1. Demonstration of conversions.
2. Elicit the logic behind conversions between octal, hexadecimal and binary.

Guidance for assessments and evaluations:
   Calculations on conversions

Quality inputs:

- **C3_3 included in the DVD**
- http://www.sciencehq.com/computing-technology/octal-number-system-and-their-conversion.html
- http://www.math-only-math.com/conversion-of-binary-numbers-to-octal-or-hexa-decimal-numbers.html
- http://www.iitg.ernet.in/asahu/cs221/Lects/Lec02.pdf

Competency Level: 3.4 Determines the capacity of data storage

Time: 2 periods

Learning Outcomes:
- Describes storage units in terms of bytes
- Compares capacity of various storage devices

Content
- Units of measurement
  Bit, Byte, Kilo Byte, Mega Byte, Giga Byte, Tera Byte
- Order of capacities of different storage devices: Cache, RAM, ROM, hard disk, compact disk, USB drives & magnetic tapes

Concepts and terms need to be highlighted:
- Logic behind the existence of many units
- Order of capacities of common storage devices

Guidance for lesson plans:

1. Display a variety of storage devices.
2. Ask to find out capacities.
3. Exercises on conversion between units.

Guidance for assessments and evaluations
    Ask students to find the capacities of various storage devices of a given computer.

Quality inputs:

- **C3_4 included in the DVD**
- http://www.lib.cam.ac.uk/dataman/pages/storage.html
- http://www.explainingcomputers.com/storage.html

Competency Level: 3.5 Explores coding systems in computers

Time: 1 period

Learning Outcomes:
- Explains how different coding systems are used
- Explains limitations of each system

Content
- BCD
- EBCDIC
- ASCII
- Unicode

Concepts and terms need to be highlighted:
- Use of Unicode

Guidance for lesson plans:
- Explain ASCII code with wordprocessing (eg. type ALT + 65 from number key pad for letter 'A')
- Explain the need of Unicode
- Explain why some coding systems are not much used now.
- Show the use of Sinhala/Tamil Unicodes to extend the standard symbols.

Guidance for assessments and evaluations
    Exercises on conversion of decimal numbers to BCD

Quality inputs:

- **C3_5 included in the DVD**
- http://www.cs.umd.edu/class/sum2003/cmsc311/Notes/Data/ascii.html
- http://www.eetimes.com/author.asp?section_id=14&doc_id=1285465

Competency: 4.0 Uses Boolean logic to work effectively with logic gates.

Competency Level: 4.1 Identifies basic logic operators and draws truth tables to illustrate their functions

Time: 2 periods

Learning Outcomes:
- Explains the action of logic gates
- Draws truth tables for logic operations

Content
- Operators: AND, OR, NOR, NAND,NOT
- Introduction to Truth Tables (maximum of three inputs)

Concepts and terms need to be highlighted:
Brief discussion of the use of gates in computer hardware

Guidance for lesson plans:
1. Explanation of the concept of gates using day-to-day examples.
2. Simulation of gates using electrical circuits.
3. Final output of a combination of logic gates (eg. In ICs).

Guidance for assessments and evaluations
1. Creation of truth tables for given logic circuits
2. Deduction of possible logic circuits from simple truth tables involving only two inputs

Quality inputs:

- **C4_1 included in the DVD**
- http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/gatesfunc/index.html
- http://computer.howstuffworks.com/boolean1.htm

Competency Level: 4.2 Applies concepts of Boolean logic to find solutions to simple day-to-day life problems.

Time: 2 periods

Learning Outcomes:
- Draws block diagrams of systems using Boolean logic
- Draws block diagrams to represent solutions to simple problems involving Boolean logic
- Converts block diagrams into logic diagrams

Content
- Design of logic for simple real world applications.
  - Alarm systems
  - Selection criteria

Concepts and terms need to be highlighted:
Selection of problems involving Boolean style logic in solutions to real life problems.

Guidance for lesson plans:
Group activity:
1. Provide a real life problem like involving a control or alarm system.
2. Ask students to design the block diagram that shows the Boolean logic behind the solution.
3. Let each group present their solution to the class.

Guidance for assessments and evaluations
Design of a block diagram of a solution to a problem involving Boolean logic.

Quality inputs:

- **C4_2 included in the DVD**
- http://www.ehow.com/info_8767345_everyday-uses-boolean-algebra.html
- http://www.quickanddirtytips.com/education/math/what-is-boolean-algebra

Competency: 5. **Works effectively with Operating Systems**
Competency Level: 5.1 Explores operating systems by type, functions, benefits and concerns.
Time: 2 periods

Learning Outcomes:
- Describes the need of an operating system
- Explains functions of an operating system
- Explains utilities of an operating system

Content
- Introduction to OS
- Evolution of computer/human interface
- Types of operating systems: single user, multi user, multi tasking, real time
- Functions of the OS: user interface and resource management
- Benefits of the OS
- Utilities of an OS: Partitioning, Formatting, Defragmentation

Concepts and terms need to be highlighted:
- Evolution of Human Computer Interface: Command prompt, GUI, Touch screen, Voice commands
- Examples of types of operating systems
- Basic operations such as control of hardware, storage management, process management, error handling, user management, user interface.

Guidance for lesson plans:
Group Activity:
1. Prior to the learning in the classroom divide students into four groups.
2. Assign one task to each group: types, functions, benefits and utilities.
3. Ask one member of each group to make a classroom presentation of the finding of the group.
4. Teacher is supposed to elaborate on their findings and complete the lesson.
Demonstration: Demonstrate partioning, formatting and defragmentation of a hard disk.

Guidance for assessments and evaluations
1. Give several cases and ask students to suggest the suitable operating system to be used.
2. Provide a case of a network environment where several applications software is being used. Ask students to list out functions of the OS with examples in this set-up.

Quality inputs:
- **C5_1 included in the DVD**
- http://www.bbc.co.uk/schools/gcsebitesize/ict/software/4operatingsystemsrev1.shtml
- http://www.bbc.co.uk/bitesize/quiz/q13567536
- http://www.revisionworld.com/gcse-revision/ict/software/operating-systems
- http://burgate-ict.pbworks.com/f/Topic+7+-+Operating+systems.ppt

Competency Level: 5.2 Handles files and folders in Operating Systems

Time: 4 periods

Learning Outcomes:
- Carries out following operations: creation, deletion, renaming, copying
- Organizes documents into folders according to needs

Content
- Introduction to the files system
  o Drives
  o Folders
  o Files and file extensions
  o File and folder operations

Concepts and terms need to be highlighted:
- User interface of the OS being used.
- Use of OS facilities available
- Customization of user interface: desktop, short-cuts, screen and energy saving
- Managing folders and files according needs of work organization.

Guidance for lesson plans:
1. Hands on use of OS in the computer lab.
2. Provide worksheets to try-out OS operations.

Guidance for assessments and evaluations
1. Conduct practical assessments to check OS operations.
2. Provide a list of user requirements with respect to a secretarial work. Ask students to design folder structure to organize documents.

Quality inputs:

- **C5_2 included in the DVD**
- http://www.nzqa.govt.nz/assets/qualifications-and-standards/qualifications/ncea/NCEA-subject-resources/Technology/91070/91070-exp-1-Achievement.pdf
- http://www.pcmag.com/article2/0,2817,2391730,00.asp

Competency: 6. Uses Wordprocessing Software to Solve Day-to-day problems

Competency Level: 6.1 Explores the concept and features of wordprocessing
Competency Level: 6.2 Performs basic tasks in wordprocessing software

Time: 5 periods

Learning Outcomes:
- Discusses facilities of wordprocessing software
- Explores GUI of wordprocessing software
- Creates new documents
- Opens existing documents
- Saves and closes documents

Content
- Functions of wordprocessing software
- GUI of wordprocessing software

Concepts and terms need to be highlighted:
- Outline of facilities available: Creation, editing, storing, sharing, use of graphics, copies
- Familiarization of the user interface
- Short-cuts for menu sequences: to open, close, save, copy, cut, paste, undo, redo

Guidance for lesson plans:
1. Discussion of the use of the software for its basic operations.
2. Discussion and demonstration of basic operations.
3. Different ways of opening a wordprocessed document: through the software, by double clicking the document, through right-clicking.
4. Saving in different formats and password protection (eg. rtf)

Guidance for assessments and evaluations:
1. Opening of a saved document on the hard disk
2. Editing the document
3. Saving in given formats

Quality inputs:

- **C6_1&2 included in the DVD**
- http://shaunakelly.com/word/concepts/introduction.html
- http://jan.ucc.nau.edu/~lrm22/technology/wpbasics/wpbasics.htm
- http://users.ipfw.edu/jehle/deisenbe/compartics/History_of_Word_Processing.pdf

Competency level 6.3: Uses different types of formatting in wordprocessing

Time: 3 periods

Learning Outcomes:
- Applies suitable text formatting
- Manipulates graphics and draws simple shapes

Content
- Formatting text
- Graphics: Insertion and formatting
- Shapes : Insertion and formatting

Concepts and terms need to be highlighted:
- Various types of formatting: Text (fonts, boldface, italics..), paragraph (center, right and left alignment, justification, bullets and numbers), page (margins, orientation)

Guidance for lesson plans:
1. Teacher demonstration of the tools of formatting.
2. Provide worksheets created to cover formatting techniques.
3. Provide meaningful exercises to enable them to learn in context.
4. Use of Unicode and Sinhala/Tamil fonts.

Guidance for assessments and evaluations
1. Provide unformatted text in soft form to carry out specified formatting.
2. Provide already done documents to recreate them using software.

Quality inputs:

- **C6_3 included in the DVD**
- http://www.teach-ict.com/gcse_new/software/word_processor/miniweb/pg4.htm
- http://www.slideshare.net/rodorgershon/formatting-word-processing-document
- http://wordprocessing.about.com/od/formattingdocument1/

Competency level: 6.4 Manipulates table feature in wordprocessing software:
Time: 2 periods

Learning Outcomes:
- Creates tables to insert data
- Formats tables
- Edits tables

Content
- Insertion of tables
- Column width and height
- Deletion, insertion, splitting and merging of cells

Concepts and terms need to be highlighted:
- Adjustment of column width: exact fit
- Continuation of title headings to succeeding pages
- Merging of cells as the final editing

Guidance for lesson plans:
1. Teacher demonstration of the tools for tables.
2. Provide worksheets created to cover working with tables.
3. Provide meaningful exercises to enable them to learn in context.

Guidance for assessments and evaluations
1. Provide a hard copy of a tabulated data with formatting like merged cells etc.
2. Ask students create the table on wordprocessing software.

Quality inputs:

- **C6_4 included in the DVD**
- http://www.tutorialspoint.com/word_2010/word_create_table.htm
- http://www.dummies.com/how-to/content/how-to-format-a-table-in-word-2010.html

Competency level 6.5: Creates and prints documents .

Time: 2 periods

Learning Outcomes:
- Checks spelling and grammar of a document.
- Prints documents with necessary settings.

Content
- Spelling and grammar checking
- Find and replace of text
- Page setup: paper size, margins, orientation and selection of printers
- Print options: copies and page range.

Concepts and terms need to be highlighted:
- Selection of the right printer when several printer software is installed.
- Limitations in built-in spellchecker and grammar checker.
- Effective use of replacing text facility: type an abbreviation and replace with the longer text.

Guidance for lesson plans:
1. Provide documents with spelling mistakes to be typed.
2. Apply spell-checker to correct mistakes
3. Use printer to take a hard-copy meeting given specifications.

Guidance for assessments and evaluations
1. Provide soft copies of documents with spelling mistakes to be corrected.
2. Provide a hardcopy and ask students to type identifying repeating words and apply replace facility for fast typing.

Quality inputs:

- **C6_5 included in the DVD**
- http://office.microsoft.com/en-us/word-help/printing-and-print-preview-in-word-2010-HA101887009.aspx
- http://www.tutorialspoint.com/word_2010/word_printing_documents.htm

Competency Level: 6.6 Uses the Mail Merge facility

Time: 80 periods
Learning Outcomes:
- Creates template document
- Creates data tables
- Merges data with template

Content
- Document types
  - Common document
  - Source data

Concepts and terms need to be highlighted:
- Usefulness of mail merge.
- Familiarization with the mail merge.
- Selection of suitable type of letters: Invitations, notifications, reminders.

Guidance for lesson plans:
1. Provide data table and master letter as hardcopies.
2. Ask students to create the master letter.
3. Ask students to carry out the mail merge.
4. Print the letters to a file.
5. Provide students with a letter suitable for mail merge.
6. Ask them to design the data table and master document.

Guidance for assessments and evaluations
1. Provide data and master document in hardcopy.
2. Students are required to carry out mail merge and save in a file.

Quality inputs:

- **C6_6 included in the DVD**
- http://www.bbc.co.uk/schools/gcsebitesize/ict/software/0wordprocessinganddtprev2.shtml
- http://wordprocessing.about.com/od/wordprocessingsoftware/a/14mailmerge.htm
- http://www.webopedia.com/TERM/M/mail_merge.html

Competency: 7. **Uses Spreadsheet to solve simple statistical problems**

Competency Levels:
- **7.1** Explores a Spreadsheet to identify its basic features and functions.
- 7.2 Moves around the worksheet to gain hands on experience of data entry

Time: 4 periods

Learning Outcomes:
- Lists functions of an electronic spreadsheet
- Identifies features of GUI of spreadsheet software
- Identifies components of a worksheet
- Enters and edits data

Content
- Introduction spreadsheets
- GUI of spreadsheet software
- Worksheet, columns, rows and cells
- Moving around worksheet.
- Data entry (label, number, formulae)

Concepts and terms need to be highlighted:
- The concept of spreadsheets
- Advantage of electronic spreadsheets over manual spreadsheets
- Insertion, deletion and renaming of worksheets.

Guidance for lesson plans:
1. Ask students to provide examples of tabulated data.
2. Start from tabulated data and move to concept of spreadsheets.
3. Demonstrate a worked spreadsheet to highlight basic features.
4. Provide worksheet to students to get familiarize with the GUI.
5. Provide a hard copy of worksheets to enter data.

Guidance for assessments and evaluations
1. Provide a collection of data suitable for creation of a worksheet.
2. Ask students to create the worksheet using the software.

Quality inputs:

- **C7_1&2 included in the DVD**
- http://home.earthlink.net/~cassidyny/spreadsheet.htm
- http://www.epa.gov/region6/qa/qadevtools/mod4references/othertools/using_excel.pdf
- http://en.kioskea.net/contents/675-introduction-to-spreadsheet-concepts

Competency Level: 7.3 Performs basic mathematical operations
Time: 2 periods

Learning Outcomes
- Carries out calculations using basic operators
- Uses cell references in calculations

Content
- Simple calculations using values and operators (+, -, *, /,^)
- Simple calculations using cell addresses and operators (+, -, *, /,^)

Concepts and terms need to be highlighted:
- Use of brackets in mathematical calculations.
- Importance of using cell addresses in calculations: ease of editing.
- Automatic recalculation.
- Copying of expressions for same calculations.

Guidance for lesson plans:
- Laboratory sessions:
  - Demonstrate how to do calculations.
  - Provide exercises on calculations to be done on software.

Guidance for assessments and evaluations
1. Provide mathematical expressions to be evaluated using spreadsheet software.
2. Provide a table of data to carry out same computations.
3. Check whether students use the software properly to avoid repeating the writing of same mathematical expressions.

Quality inputs:

- **C7_3 included in the DVD**
- http://spreadsheets.about.com/od/excelformulas/ss/2010-12-25-excel-2010-basic-tutorial-pt1.htm
- http://www.hollyfield.kingston.sch.uk/gcseit/GCSE/ssheet.htm

Competency Level: 7.4 Uses inbuilt functions for calculations

Time: 2 periods

Learning Outcomes
- Identifies functions and its parameters
- Uses basic built-in functions in calculations

Content
SUM, AVERAGE, MAX, MIN, COUNT

Concepts and terms need to be highlighted:
- Difference between inbuilt functions and user defined functions.
- Use of cell references in using the functions.
- Insertion of columns and rows in the already existing worksheet.

Guidance for lesson plans:
Laboratory sessions:
1. Demonstrate the use of functions.
2. Provide worksheets to create electronic version of it using software.

Guidance for assessments and evaluations
1. Provide a data set to perform specified calculations using software.
2. Exercises on manual spreadsheet calculations.

Quality inputs:

- **C7_4 included in the DVD**
- http://spreadsheets.about.com/od/excelfunctions/
- http://en.kioskea.net/contents/672-spreadsheet-functions
- http://www.bbc.co.uk/bitesize/ks3/ict/software_applications/spreadsheets/revision/6/

Competency Level: 7.5 Formats a worksheet

Time: 2 periods

Learning Outcomes
- Formats and aligns data in cells
- Sets decimal places according to requirements

Content
- Font, Font size, Boldface, Italic etc.
- Alignment (centre, left, right, justify)
- Decimal places (increase and decrease)

Concepts and terms need to be highlighted:
   Selection of formatting according to the needs

Guidance for lesson plans:
   Laboratory sessions
   1. Remind similarity of the IDE with Wordprocessing software.
   2. Demonstrate the use of formatting.
   3. Provide worksheets to enter data and apply formatting.

Guidance for assessments and evaluations
   1. Provide an unformatted data table.
   2. Ask students to create worksheet according to the given specifications.

Quality inputs:

- **C7_5 included in the DVD**
- http://spreadsheets.about.com/od/excelformatting/ss/number_format.htm
- http://www.techrepublic.com/blog/windows-and-office/20-excel-tips-for-creating-stylish-spreadsheets/
- http://office.microsoft.com/en-001/excel-help/quick-start-format-a-worksheet-HA010380498.aspx

Competency Level: 7.6 Uses relative versus absolute cell references appropriately.
Time: 2 periods

Learning Outcomes
- Explains relative and absolute addressing modes.
- Uses both modes appropriately in calculations.

Content
Absolute and Relative cell references.

Concepts and terms need to be highlighted:
- The difference between relative and absolute modes of addressing.
- Behaviour of cell addresses in copying of formulae.
- Usefulness of absolute addressing.

Guidance for lesson plans:
1. Demonstrate the use of relative and absolute addresses
2. Demonstrate the advantage of using absolute addressing
3. Ask students to find out the behavior of functions when relative and absolute cell addresses are used
4. Provide sufficient number of examples of the use of both addressing modes.

Guidance for assessments and evaluations:
1. Problems involving both mode of addressing to be solved manually.
2. Implementation of such solution using software.

Quality inputs:

- **C7_6 included in the DVD**
- http://web.pdx.edu/~stipakb/CellRefs.htm
- http://spreadsheets.about.com/od/r/g/rel_cell_ref.htm
- http://www.gcflearnfree.org/googlespreadsheets/14.2

Competency Level: 7.7 Creates charts using Spreadsheets to explain data.
Time: 2 periods

Learning Outcomes
- Identifies the relevant chart type
- Present data using suitable built in chart types

Content
- Charts: chart type, chart options
- Chart types: Bar, column, line and pie

Concepts and terms need to be highlighted:
- Selection of suitable chart type.
- Selection of non-adjacent columns.
- Relocation of a chart to a new sheet.
- Labeling of the chart.

Guidance for lesson plans:
1. Demonstrate the creation of charts.
2. Provide worksheets with specification for charts.

Guidance for assessments and evaluations:
Laboratory sessions:
Creation of graphs for given data sets.

Quality inputs:

- **C7_7 included in the DVD**
- http://www.wikihow.com/Create-a-Graph-Using-a-Spreadsheet
- https://support.google.com/docs/answer/63728?hl=en

Competency Level: 8.1 Produces effective presentations integrating multimedia

Time: 3 periods

Learning Outcomes
- Applies good practices in the use of presentation software
- Formats slide layouts
- Insert text, images, movies and sounds

Content
- Introduction to presentation software.
- Changing background, slide layout, slide designs.
- Inserting text and multimedia .

Concepts and terms need to be highlighted:
- Significance of designing the presentation on a paper before use of software.
- Meaningful use of multimedia.

Guidance for lesson plans:
1. Provide exemplary presentations and let students to draw the slide design on a paper.
2. Let students select a theme of their own choice and design their presentation on a paper.
3. Let students use presentation software to convert designs into the presentations.
4. Organise a pair work to design presentations independently. Then ask them to exchange designs. Then one member has to develop the other one's design into the final product.

Guidance for assessments and evaluations
1. Provide students with a design.
2. Ask them to create the presentation as per the design

Quality inputs:

- **C8_1 included in the DVD**
- http://www.streetdirectory.com/travel_guide/137791/computers/using_multimedia_in_powerpoint_presentations.html
- http://www.presentationmagazine.com/how-to-create-a-multimedia-presentation-164.htm
- https://www.gonzaga.edu/Campus-Resources/Offices-and-Services-A-Z/Training/Pics-and-docs/Powerpoint/Advanced-PowerPoint-and-Multimedia.pdf

Competency Level: 8.2 Applies suitable animations to enhance the quality of presentations

Time: 3 periods

Learning Outcomes:
- Applies suitable screen transitions
- Applies suitable animations on screen objects

Content
- Slide transitions
- Custom animations

Concepts and terms need to be highlighted:
- Meaningful use of slide transitions.
- Meaningful use of object animations.
- Use of custom animations for simple simulations.

Guidance for lesson plans:
1. Provide design specifications for a presentation involving animations.
2. Ask students to convert specifications into presentations.
3. Let students develop their own presentations.

Guidance for assessments and evaluations
- Ask students to create a presentation of educational value using multimedia and animations.

Quality inputs:

- **C8_2 included in the DVD**
- http://www.facultyfocus.com/articles/learning-styles/how-much-multimedia-should-you-add-to-powerpoint-for-online-students/
- http://tep.uoregon.edu/technology/multimedia/multimedia.html
- http://www.learnnc.org/lp/pages/647

Competency: 9.0 Develops simple databases to elicit information.

Competency Level: 9.1 Develops simple databases to elicit information.
Time: 3 periods
Learning Outcomes:
- Discusses nature and advantages of databases
- Explains the features of relational databases
- Explores the Concept of Database

Content:
- Introduction to databases.
- Definition of a database.
- Advantages of databases.
- Features of databases: Absence of redundancy, Efficiency, Accuracy, Consistency, Security, Validity, Simplicity.
- Manual and electronic databases: comparison and contrast.
- Introduction to Relational Databases: Tables, records, fields, key fields.

Concepts and terms need to be highlighted:
- Identification of databases with reference to a theme.
- Explain with examples features a database should have: Absence of redundancy, Efficiency, Accuracy, Consistency, Security, Validity, Simplicity.
- Explain why at least two tables are needed to have the above qualities.
- Provide examples to explain the above.(Biodata and marks)
- Do not refer to any electronic media.

Guidance for lesson plans:
1. Lead a discussion to identify places where data are stored.
2. Let students explain how they are organized (eg. Student registration details and attendance register)
3. Provide examples to demonstrate how absence of good database qualities could cause problems.

Guidance for assessments and evaluations
1. Give a case of a database where entities are mentioned so that students can easily identify tables. Ask students to identify fields and key fields.
2. Ask students to identify instances of related tables.
3. Ask students to mention how to establish qualities.

Quality inputs:
- **C9_1 included in the DVD**
- http://web.synametrics.com/WinSQL.htm
- http://www.teach-ict.com/gcse_computing/ocr/databases/relational/miniweb/index.htm
- http://gcsecomputing.net/wp-content/uploads/2012/01/OCR-A451-2.1.5-Databases-Summary.pdf

Competency Level: 9.2 Creates a simple database with a single table, manually.

Time: 2 periods

Learning outcomes:
- Identifies the purpose of the database
- Select suitable fields to create data tables

Content
- Field name, unique field, data types, field size

Concepts and terms need to be highlighted:
- Identification of the database.
- Identification of the tables, fields, type of the fields, key fields.
- Identification of the relationship.
- Graphical representation of the database with tables.
- Not to include calculated data like age.

Guidance for lesson plans:
1. Give a case where databases are involved.
2. Ask to identify one table, its fields and types.
3. Give partly worked examples to complete relational databases.
4. Discuss examples on how to break a database into tables.
5. Start off with a single table where everything is included.
6. Let students find fields and field types.
7. Let students find out key fields.

Guidance for assessments and evaluations
1. Give a case involving several databases.
2. Ask to identify one of them.
3. Ask to design a table with fields, field types and sizes.

Quality inputs:

- **C9_2 included in the DVD**
- http://office.microsoft.com/en-001/access-help/database-design-basics-HA001224247.aspx
- http://www.cs.ucr.edu/~vagelis/classes/FIU-CLASSES/COP5725/slides/ch2-3%20Practice%20Exercises.pptx
- http://www.cs.nott.ac.uk/~tjb/dbs/labs/exercise1.html

Competency Level: 9.3 Converts a manual database into electronic media.
Time: 2 periods

Learning outcomes:
- Identifies the purpose of the database
- Select suitable fields to create data tables

Content:
Field name, data types, field size, Primary key, Field properties

Concepts and terms need to be highlighted:
- Relevant features of the IDE of the database software
- Naming of the fields and selecting suitable field types and sizes

Guidance for lesson plans:
1. Use manual databases created in 9.2
2. Create the tables.
3. Set primary keys.
4. Enter data.

Guidance for assessments and evaluations:
1. Provide a paragraph describing a database.
2. Ask students to sketch the database on paper.
3. Convert it into computer database using software.

Quality inputs:

- **C9_3 included in the DVD**
- https://weblearn.ox.ac.uk/access/content/group/e05e05d2-f4ce-4a24-a008-031832bd1509/LearningRes_Open/Course_Book_Access_TDAC_Creating_Qu_Fo_Re10.pdf
- http://www.jegsworks.com/lessons/databases/tablesqueries/ex1.htm
- http://www.cob.sjsu.edu/gaines_j/Bus188%20Materials/F08Bus188%20Lab%20Instructions.htm

Competency Level: 9.4 Design a simple relational database..
Time: 2 periods

Learning outcomes
- Designs simple relational databases manually
- Identifies primary and foreign keys

Content
Tables, fields and key fields: Primary key, foreign key, relationships

Concepts and terms need to be highlighted:
- Definitions of primary and foreign keys.
- Advantages of such a connection.
- Selection of examples for situations where related entities are clearly visible.
- Breaking of one table into at least two to establish relationships.

Guidance for lesson plans:
1. A group activity involving 3 per group.
2. Each group is given a case to design at least two related tables.
3. Identification of primary and foreign fields.

Guidance for assessments and evaluations:
1. Provide a case involving a relational database.
2. Ask students to create relevant tables.
3. Ask them to identify primary and foreign keys.

Quality inputs:

- **C9_4 included in the DVD**
- http://www.paolocoletti.it/informationsystems5/exercises/RelationalDB.pdf
- http://codex.cs.yale.edu/avi/db-book/db6/practice-exer-dir/2s.pdf
- http://www.cs.indiana.edu/classes/a114-dger/lastYear/flights.pdf
- http://portfolio.it.ox.ac.uk/resource/course-pack/access-practice-relational-databases-integrated-assignment/2010
- http://code.tutsplus.com/tutorials/relational-databases-for-dummies--net-30244

Competency Level: 9.5 Uses DBMS software to create relational databases

Time: 2 periods
Learning outcomes:
- Creates relational databases using DBMS software
- Implements relationships

Content:
- Creation of a database
- Identification of primary and foreign key
- Creation of relationship between tables

Concepts and terms need to be highlighted:
- IDE of the software.
- Use of a meaningful cases to create databases.
- Setting of primary key with no duplicates.
- Creation of the relationship with referential integrity.
- Use of test data.
- Deletion of data from tables to test referential integrity.
- May limit work to two tables but if students progress allow them to have more relations.

Guidance for lesson plans:
1. May use the databases created in 9.4
2. Pair-work is to be arranged in the computer lab

Guidance for assessments and evaluations:
1. Use the created databases to evaluate performance.
2. Look for meaningful fields with correct types and sizes.
3. Check setting of primary and foreign keys

Quality inputs:

- **C9_5 included in the DVD**
- http://www.opensource.bda.lv/files/EN/Module_5_Base_student_eng.pdf
- http://databases.about.com/cs/tutorials/a/widgetmenu.htm
- http://www.ntu.edu.sg/home/ehchua/programming/sql/Relational_Database_Design.html
- http://www.fabalou.com/Access/General/relational.asp

Competency Level: 9.6 Uses forms to view and update data

Time: 2 periods

Learning outcomes:
- Designs data input and editing forms
- Inserts suitable controls to manipulate data

Content:
- Form design
- Manipulation of properties of a form
- Insertion of controls: Delete button

Concepts and terms need to be highlighted:
- Design of a layout of a form before the use of software.
- Selection of suitable fonts.
- Navigation with provided controls.
- Editing and appending.

Guidance for lesson plans:
1. Use databases created in 9.4.
2. Pair-work at a single computer.
3. Entry of meaningful data.
4. Inclusion of the Delete button to delete records.

Guidance for assessments and evaluations
Provide a predesigned database to create data entry forms.

Quality inputs:

- **C9_6 included in the DVD**
- http://office.microsoft.com/en-001/access-help/introduction-to-forms-HA010343724.aspx
- http://databases.about.com/od/tutorials/ss/Creating-Forms-In-Microsoft-Access-2010.htm
- http://www.gcflearnfree.org/access2007/7
- https://wiki.openoffice.org/wiki/Documentation/OOoAuthors_User_Manual/Getting_Started/Creating_a_database_form

Competency Level: 9.7 Creates Queries to extract information.

Time: 2 periods.

Learning outcomes:
Performs simple queries with built in criteria on the database.

Content:
- Design of queries using query tool without using SQL structure.
- Use of criteria.
- Sorting of records.

Concepts and terms need to be highlighted:
- Single table with criteria.
- Two related tables with criteria.
- Variety of data to enable variety of queries.

Guidance for lesson plans:
1. Pair-work.
2. Provide a worksheet with suggested details to be retrieved using queries.

Guidance for assessments and evaluations:
1. Provide a single table with redundant data.
2. Ask to create the database with two related (one to many) tables.
3. Ask various ways of information retrieval to be implemented using queries.

Quality inputs:

- **C9_7 included in the DVD**
- http://inpics.net/tutorials/base2/queries2.html
- http://openoffice.blogs.com/openoffice/databases/
- http://www.informit.com/articles/article.aspx?p=29661
- http://ulearnoffice.com/access/queriesexercices.htm#access-queries-exercices-q1

Competency Level: 9.8 Creates reports to present information

Time: 2 periods

Learning outcomes
- Creates reports for given purposes
- Prints reports

Content:
- Use of report Wizard
- Printing of reports

Concepts and terms need to be highlighted:
- Reports based on queries.
- Grouping of information using the primary key.
- Taking summation of numerical field.

Guidance for lesson plans:
1. Pair-work at a computer.
2. Provide a worksheet describing a database with data.
3. Ask to create queries for given criteria.
4. Ask to create reports based on the queries.

Guidance for assessments and evaluations:
1. Provide a database with two related tables (one to many)
2. Give a set of report formats to create reports

Quality inputs:
- **C9_8 included in the DVD**
- http://www.jenster.com/Access_all_exercises.pdf
- https://weblearn.ox.ac.uk/access/content/group/e05e05d2-f4ce-4a24-a008-031832bd1509/LearningRes_Open/Course_Book_Access_TDAD_Designing_Fo_Re10.pdf
- http://www.gcflearnfree.org/access2010/10.2
- http://holowczak.com/microsoft-access-2007-and-2010-tutorial/12/
- https://help.libreoffice.org/Common/Report_Build