G.C.E. (Advanced Level)

Information and Communication Technology

Syllabus (Revised)

Grades 12 and 13

(For G.C.E. (A/L) Examination to be held in 2015 onwards)

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Faculty of Science and Technology,

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Maharagama.

1.0 Introduction

Information and Communication Technology has been identified worldwide as a tool that can be used to improve productivity, efficiency and effectiveness of organizational work and the daily activities of individuals. Therefore, providing an adequate level of ICT knowledge and skills, at different levels of education, is important for the students to progress and contribute towards national development.

The current Sri Lankan Secondary Education System has been substantially exposed to ICT through various programmes including CAL, ICT for GCE (O/L) and GIT at grade 12. Consequently, students have shown a growing interest in ICT education and some have, in fact, performed excellently at international competitions in ICT, proving their high level of competence.

At present there is no main subject area under ICT for GCE (A/L). Therefore, GCE (O/L) qualified students, interested in developing their career path in ICT, are deprived of the opportunity of learning it at the GCE (A/L). Introducing ICT as a subject for A/L would set a national standard in ICT education at school level and provide the path to higher education at tertiary level. Furthermore, students who fail to earn a placement in a university would be in possession of a substantial foundation to build up their academic and professional careers.

The ICT syllabus at GCE (A/L) communicates core concepts of ICT covering both theoretical and practical usage of ICT .This will also strengthen student's awareness of the new trends and future directions of ICT, while encouraging them to inculcate basic skills needed to carry out research at higher education level and to apply such knowledge practically. Also this subject will provide an added advantage to students by improving their soft skills, thereby enabling them to best fit into working environments.

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2.0 Objectives of the Subject

- Establish the foundation for ICT education leading to higher education

- Provide students with ICT knowledge that can be applied in other fields

- Provide students with ICT knowledge to improve the quality of life in general

- Improve the skills required for the development of ICT based solutions for real world problems.

- Provide awareness of the importance of computer networking for communication.

- Provide awareness of the new trends and future directions of ICT.

- Enable students to use ICT for innovation and researches.

- Develop an appreciation of the role of ICT in a knowledge-based society.

Revisions included in 2013 under competency levels for the syllabus implemented on 2009

Suggested number of periods for the revised syllabus is 441.

Competency Level	Removed subject content
Competency Level 1.1	Definition of knowledge
Competency Level 1.5	• Use of check digits under Data validation methods • Data verification under Modes of data input
Competency Level 1.6	• ICT in advertising • ICT in teaching and learning
Competency Level 1.7	• ICT and other technologies
Competency Level 2.1	• Towards Modern Computers
Competency Level 2.3	• Instruction Set Architecture (ISA) • CISC and RISC Architectures
Competency Level 3.4	• IEEE 754, 32 bit single precision representation of floating point numbers
Competency Level 5.3	• Early memory organizations under Memory Organization • Virtual Memory Management under Maintenance of secondary storage
Competency Level 6.1	• Virtual Machines

Competency Level	Removed subject content
Competency Level 7.11	Completely removed
Competency Level 7.12	Completely removed
Competency Level 7.15	Completely removed
Competency Level 8.3	• Basic Digital Encoding Methods
Competency Level 9.3	Completely removed
Competency Level 9.4	• Meta data under Databases • Application Programs
Competency Level 9.5	Completely removed
Competency Level 9.10	• DCL • VDL
Competency Level 10.6	Completely removed
Competency Level 10.7	Completely removed
Competency Level 10.8	Completely removed

Proposed Term-based Breakdown of the Syllabus (Revised)

Grade	Term	Competency &Competency Levels		
12	1st Term	Competency Levels	1.1 to 1.4	(16 Competency Levels)
		Competency Levels	3.1 to 3.4	
		Competency Levels	4.1 to 4.3	
		Competency Levels	7.1 to 7.3	
		Competency Levels	11.1 to 11.2	
	2nd Term	Competency Levels	1.5 to 1.7	(18 Competency Level)
		Competency Levels	2.1 to 2.3	
		Competency Levels	6.1 to 6.4	
		Competency Levels	7.4 to 7.6	
		Competency Levels	9.1 to 9.3	
		Competency Levels	11.3 to 11.4	
	3rd Term	Competency Levels	12.1 to 12.3	(15 Competency Levels)
		Competency Levels	8.1 to 8.2	
		Competency Levels	10.1 to 10.2	
		Competency Levels	7.7 to 7.9	
		Competency Levels	11.5 to 11.7	
		Competency Levels	9.4 to 9.5	
13	1st Term	Competency Levels	10.3 to 10.4	(16 Competency Levels)
		Competency Levels	5.1 to 5.3	
		Competency Levels	11.8 to 11.9	
		Competency Level	7.10	
		Competency Levels	8.3 to 8.8	
		Competency Levels	9.6 to 9.7	
	2nd Term	Competency Level	10.5	(14 Competency Levels)
		Competency Levels	7.11 to 7.12	
		Competency Levels	8.9 to 8.12	
		Competency Levels	9.8 to 9.9	
		Competency Levels	13.1 to 13.5	
	3rd Term	Competency Level	10.6	(7 Competency Levels)
		Competency Level	7.13	
		Competency Levels	8.13 to 8.15	
		Competency Levels	14.1 to 14.2	

3.0 Syllabus for Information and Communication Technology G.C.E Advanced Level (Reviewed in 2013)

Note: The numbers given for the competency levels are rescheduled.

Competency	Competency level	Content	Periods

Competency 1:
 	
Explores the basic concepts of ICT together with its role and applicability in today's knowledge based society.
	1.1 Investigates the basic building blocks of information and their characteristics.	o Data
		  ■ Data and its existence in multi-media form
		  ■ Characteristics of data
		  ■ Manipulating data
		o Information
		  ■ Creating information
		  ■ Characteristics of information
		  ■ Quality of information
		  ■ Value of information
		  ■ Relevance of information
			05

	1.2 Investigates the need of technology to create, disseminate and manage data and information.	o Drawbacks of manual methods in manipulating data and information in bulk
		  ■ Slowness
		  ■ Unreliability
		  ■ Inaccuracy
		o Emergence of IT era
		  ■ Realizing the importance of information in daily life
		  ■ Availability of electronic and other technologies
		o Merging of information technology and communication technology
		  ■ Development of the Internet and the WWW
		  ■ Development of mobile computing and communication devices
			06

Competency	Competency level	Content	Periods

	1.3 Creates an abstract model of information and evaluates its compliance with ICT.	o Abstract model of information
		   ▪ Input, Process, Output
		o Time value of information
		   ▪ Highest value of information
		o Computer and its appropriateness to ICT
			04

	1.4 Selects and classifies the basic components of a computer system.	o Hardware, Software and Firmware o Classification of Hardware o Classification of Software o Proprietary software and Open-source software	05

	1.5 Analyses the activities of Data Processing Life Cycle.	o Data gathering methods
		   ▪ Manual methods
		   ▪ Automatic methods
		      • OMR, OCR, MICR, Card/Tape Magnetic stripe readers
		      • Sensors and Loggers
		o Data validation methods
		   ▪ Type check, Presence check, Range check
		o Modes of data input
		   ▪ Direct and Remote
		   ▪ Online and Offline
		o Data processing
		   ▪ Batch and real time
		o Storage methods
		o Output methods
			06

Competency	Competency level	Content	Periods

	1.6 Investigates the use of ICT in different field of applications in organizations.	o Working practices
		  ■ Presentations
		  ■ Telecommuting
		  ■ Video conferencing
			02

	1.7 Evaluates the impact of ICT on the society.	o Benefits created by ICT
		  ■ Social, Economical
		o Issues created by ICT
		  ■ Social
		  ■ Economical
		  ■ Environmental
		  ■ Ethical
		  ■ Legal
		    • Privacy and Piracy
		    • Copyright
		    • Plagiarism
		    • Licensed software
			06

Competency	Competency level	Content	Periods

Competency 2:
 	
Explores the evolution of computers so as to be able to describe and compare the performance of a modern computer.
	2.1 Elicits the significant changes occurred in the computers from
	
	generation to generation with more emphasis on the evolution of processors.
		o History of computing
		    ■ Early calculating aids
		      ● Mechanical calculators/computers
		      ● Electromechanical computers
		    ■ Electronic age of computing
		    ■ Different classifications
		      ● Analog, Digital
		      ● 1G, 2G, 3G, 4G and Future Generations
		      ● Super, Mainframe, Mini, Micro
		      ● PDAs, Mobile Devices
			04

	2.2 Explores the functionality of a computer in relation to the evolution of hardware and interfaces.	o Major Hardware Components
		    ■ Input Devices and Interfaces
		    ■ CPU and Motherboard
		    ■ Output Devices and Interfaces
		    ■ Storage Devices and Interfaces
			06

Competency	Competency level	Content	Periods

	2.3 Explores the evolution of computer architectures.	o von-Neumann Architecture
		  ▪ Stored Program Control concept
		  ▪ Input, Output, Memory, Control Unit and Processing Unit
		  ▪ Fetch-execute cycle
		  ▪ Central Processing Unit (CPU)
		  ▪ Arithmetic and Logic Unit (ALU)
		  ▪ Control Unit (CU)
		  ▪ Memory
			05

Competency 3:
 	
Investigates how data are represented in computers and exploits them in arithmetic and logic operations.
	3.1 Analyses how numeric data are represented in computers.	o Decimal representation of numbers (Signed and Unsigned)
		  ▪ Integers
		  ▪ Fixed Point and Floating-Point numbers
		o Number systems used in computing
		  ▪ Binary, Octal, Hexa-decimal
		o Conversions among number systems
			05

	3.2 Analyses how character data are represented in computers.	o BCD o EBCDIC o ASCII o Unicode	04

Competency	Competency level	Content	Periods
	3.3 Uses basic arithmetic and logic operations on Binary, Octal and Hexa-decimal numbers.	o Addition, Subtraction, Multiplication, Division o Bitwise logic operations	05
	3.4 Analyses how signed numbers are represented in computers and uses standard methods to represent floating point numbers.	o One's complement and Two's complement o Representing floating point numbers in normalized form	05

Competency 4:
 	
Uses Logic Gates to design basic Digital Circuits and Devices.
	4.1 Analyzes basic digital logic gates
	in terms of their unique functionalities.
		o Digital Logic Gates and Truth Tables
		  ▪ Basic logic gates
		    ● NOT, OR, AND, XOR
		  ▪ Combinational
		    ● NOR, NAND, XNOR
			04

Competency	Competency level	Content	Periods

	4.2 Simplifies logic expressions using laws of Boolean Algebra and Karnaugh Map method.	o Two state logic and Boolean Algebra
		o Postulates (Axioms)
		o Laws/Theorems
		  ▪ Commutative, Associative, Distributive
		  ▪ Identity, Redundancy
		  ▪ De Morgan's
		o Standard Logical Expressions
		  ▪ Sum of Products & Product of Sums
		  ▪ Transform SOP into POS and vice versa
		o Simplify logic expressions using
		  ▪ Boolean theorems
		  ▪ Karnaugh Maps
			05

	4.3 Designs simple digital circuits and devices using logic gates.	o Truth tables and logic expressions. (up to four inputs) o Digital circuit design	05

Competency 5:
 	
Uses Memory Management to improve performance of a Computer.
	5.1 Examines PC memory system to identify different type of memories and their main characteristics.	o Volatile Memories and their characteristics
		  ▪ Registers
		  ▪ Cache Memory
		  ▪ Main Memory – RAM
		o Non Volatile Memories and their characteristics
		  ▪ Secondary Storage
		    • Magnetic, Optical, Flash Memory
		  ▪ ROM
		    • BIOS, CMOS
			06

Competency	Competency level	Content	Periods

	5.2 Distinguishes between different type of memories.	o Comparison Criteria
		• Physical size/Density
		   ▪ Access method
		   ▪ Access time
		   ▪ Capacity
		   ▪ Cost
			04

	5.3 Organizes memory in order to improve performance of computers.	o Memory Organization
		   ▪ Memory hierarchy
		o Maintenance of secondary storage
		   ▪ Disk Cleaning
		   ▪ Disk Checking
		   ▪ Disk De-fragmentation
			04

Competency	Competency level	Content	Periods

Competency 6:
 	
Uses Operating Systems to manage the overall functionality of computers.
	6.1 Defines the term computer Operating System (OS) and investigates their need in computer systems.	o Introduction to computer Operating Systems
		    ▪ Booting of computer
		o Classification
		    ▪ Single user – single task
		    ▪ Single user – multi task
		    ▪ Multi user – multi task
		    ▪ Multi threading
		    ▪ Real time
		o Need for an Operating System
		    ▪ Interface between user and the machine
		    ▪ Hardware control and software management
			04

Competency	Competency level	Content	Periods

	6.2 Explores how an OS manages directories and files in computers.	o File types
		    ▪ ASCII Text, Binary, Formatted and Other
		o File operations
		    ▪ Create, open and close
		    ▪ Read, write and attribute change
		    ▪ Rename, copy, move and delete
		    ▪ Merge
		o File Security
		    ▪ Passwords and Access privileges
		o Directory and file organization
		o File Storage management
		    ▪ File control block
		    ▪ Block based organization
		    ▪ Index allocation
		    ▪ Fragmentation
		    ▪ FAT, NTFS
			05

	6.3 Explores how an OS manages Processes in computers.	o Process management
		    ▪ Multi programming systems
		    ▪ Time sharing systems
		o Processor utilization
		o Process states
		o Process scheduling
			05

Competency	Competency level	Content	Periods
	6.4 Explores how an OS manages memory and input & output operations in computers.	o Memory management ▪ Memory allocation ▪ Swapping, fragmentation and compaction ▪ Garbage collection ▪ Protecting processes ▪ Virtual memory • Paging, Mapping o Input output device management ▪ Managing events o Hardware software interaction ▪ Device drivers	05
Competency 7: Uses Programming Languages to program computers to solve problems.	7.1 Uses problem-solving process.	o Understanding the problem o Define the problem, Define boundaries o Plan solution o Check solution	04
	7.2 Uses Top-down/Stepwise refinement methodology to solve problems.	o Modularization and Mash ups o Top down design and stepwise refinement o Structure charts	05
	7.3 Uses algorithmic approach to solve problems.	o Algorithms o Flow charts o Pseudo codes o Hand traces	06

Competency	Competency level	Content	Periods

	7.4 Examines the process of program translation and execution and uses translators to translate source codes into machine codes.	o Source program
		o Object program
		o Program Translators
		   ▪ Interpreters
		   ▪ Compilers
		   ▪ Binary code and Byte code
		   ▪ Assemblers
		o Linkers
		o Executable code
			04

	7.5 Explores Integrated Development Environments (IDE) to identify their basic features.	o Basic features of IDEs
		o Instructions to use
		   ▪ Opening and Saving files
		   ▪ Compiling, Executing programs
		   ▪ Debugging programs
			06

	7.6 Uses the lexical elements of a programming language in programming.	o Comments
		o The role of constants and variables
		o Data Types
		   ▪ Primitive
		   ▪ Objective
		o Operator Categories
		   ▪ Arithmetical, Relational, Logical, Bitwise
		   ▪ Precedence
			06

Competency	Competency level	Content	Periods

	7.7 Uses control structures in developing programs.	o Sequence
		o Selection
		    ▪ Simple selection
		    ▪ Multiple selection
		o Iteration
		    ▪ Counter controlled
		    ▪ Logic controlled
		o Selective/Iterative controls
		    ▪ Break, Continue
			08

	7.8 Uses libraries and services in Programs.	o Standard library
		    ▪ System module
		    ▪ OS module
		o Access of service routines
			06

	7.9 Uses functions in programs.	o Functions
		    ▪ Structure of a function
		    ▪ Pre-made functions
		    ▪ Return values
		    ▪ Command line arguments
		    ▪ User defined functions
		o Function parameters
		    ▪ Parameter passing
		    ▪ Local and global parameters
		    ▪ Default argument values
		    ▪ Keyword arguments
			08

Competency	Competency level	Content	Periods
	7.10 Compares and Contrasts different programming paradigms.	o Evolution of programming languages 　　▪　1GL, 2GL, 3GL and 4GL o Features of Imperative High-Level languages o Programming Approaches 　　▪　Unstructured 　　▪　Structured (Functional/Procedural) 　　▪　Object Oriented	08
	7.11 Uses data structures in programs.	o Need for data structures o Examples of data structures o Single dimensional data structures 　　▪　Index 　　▪　Basic operations	08
	7.12 Handles files and databases in programs.	o Basic file operations 　　●　Open, close 　　●　Read and write o Basic database operations 　　●　Select 　　●　Insert 　　●　Update 　　●　Delete	08
	7.13 Searches and sorts data.	o Searching techniques 　　▪　Sequential search 　　▪　Binary Search o Sorting techniques 　　▪　Selection sort 　　▪　Bubble sort	08

Competency	Competency level	Content	Periods

Competency 8:
 	
Explores the use of Data Communication & Computer Network Technologies for effective communication of data & voice and resource sharing.
	8.1 Develops an abstract model for communication using logical components.	o Introduction to data communication
		o Components of a data communication system
		    ▪ Transmitter, Receiver
		    ▪ Communication medium
		    ▪ Protocols
		       ● Synchronization, Acknowledgement
		    ▪ Signals
		       ● Analog, Digital
		o Representation of data in signal form
			04

	8.2 Compares and contrasts manual communication methods with modern communication methods to ascertain the necessity of current technologies.	o Manual methods
		o Electronic and computer based methods
		    ▪ Telephone
		    ▪ Radio, TV
		    ▪ Satellite
		    ▪ ISDN, ADSL/DSL, CDMA, GPRS, GSM
			05

Competency	Competency level	Content	Periods

	8.3 Investigates data transmission methodologies for effective communication.	o Data transmission and reception
		o Carrier signals
		o Basic modulation techniques
		  ▪ Analog - AM, FM, PM
		  ▪ Digital – ASK, FSK, PSK
		o Digital to analog conversion
		  ▪ MODEM
		o Analog to digital conversion
		  ▪ PCM, CODEC
			05

	8.4 Explores multiplexing techniques for media sharing.	o Need for multiplexing
		o Introduction to Multiplexing
		  ▪ Frequency Division Multiplexing
		  ▪ Time Division Multiplexing
		  ▪ Code Division Multiplexing
			04

	8.5 Selects appropriate transmission media for data communication.	o Guided media
		  ▪ Open wire, Twisted pair, Coaxial cable
		  ▪ Fiber Optics
		  ▪ IEEE standard notation for cables
		o Unguided media
		  ▪ Radio
		  ▪ VHF/UHF, Microwave (Terrestrial/Satellite)
		  ▪ Infrared
		  ▪ Laser
			05

Competency	Competency level	Content	Periods
	8.6 Analyzes transmission impairments to improve efficiency and quality of data transmission.	o Distortion ■ Causes and remedies o Attenuation ■ Causes and remedies o Noise ■ Types ■ Reduction methods	04
	8.7 Compares benefits and issues of computer networks.	o Introduction to computer networks o Advantages and disadvantages	04
	8.8 Selects computer network types, topologies and models that matches different needs and environments.	o Definition of computer networks o Network Types ■ LAN, WAN, MAN, DAN, CAN o LAN Topologies ■ Bus, Star, Ring, Mesh, Hybrid o Network models ■ Peer to peer ■ Client-server o Virtual Private Networks o Testing methods ■ Ping and ipconfig	05

Competency	Competency level	Content	Periods

	8.9 Uses Open Systems Interconnection (OSI) layered protocol architecture as a reference model for networking.	o Open systems versus Closed systems
		   ■ OSI seven layer reference model
		     ● Physical layer
		     ● Data link layer
		     ● Network layer
		     ● Transport layer
		     ● Session layer
		     ● Presentation layer
		     ● Application layer
		o Basic functions of each layer
			05

	8.10 Explores basic devices, and protocols used in networks.	o Network devices used and their basic functions.
		   ■ Repeaters, Regenerators
		   ■ Hubs, Bridges and Switches
		   ■ Routers and Gateways
		o Basic protocols
		   ■ Ethernet-IEEE 802.3 (CSMA/CD)
		   ■ Token ring – IEEE 802.5
		   ■ IP, TCP, UDP, ICMP
		   ■ FTP, SMTP, POP, PPP, Telnet
			05

Competency	Competency level	Content	Periods
	8.11 Explores the basic principles of Client-Server computing.	o Client-server configuration • 　　■　　Clients 　　■　　Servers 　　　　●　　　Web servers, Mail servers 　　　　●　　　Proxy servers, Application servers 　　　　●　　　DNS servers 　　　　●　　　DHCP servers 　　■　　Leased lines, ISPs, Gateways	05
	8.12 Explores the addressing schemes used in networks.	o Use of Physical address and Logical address o IP addressing (IPv-4) 　　■　　Network classes 　　　　●　Class A, Class B, Class C 　　■　　Subnets 　　　　●　　　Subnet masks	05

Competency	Competency level	Content	Periods

	8.13 Explores the structure and technology of the Internet and World Wide Web and their services.	o The Internet
		   ■ Network of networks
		   ■ Hosts, ISPs, Backbone, Bandwidth
		   ■ Coverage and features
		   ■ TCP/IP protocol and Intranets
		   ■ Packet transmission, switching and routing
		   ■ Uniform Resource Locators
		   ■ Cookies
		   ■ Internet Engineering Task Force
		o Services provided
		o The World Wide Web
		   ■ HTTP and Hyper media
		   ■ Technological Perspective
		   ■ Web browsers
		   ■ Newsgroups, Portals, Blogs, VOIP
		   ■ World Wide Web Consortium (W3C)
			05

Competency	Competency level	Content	Periods
	8.14 Explores the vulnerabilities and possible threats & attacks to computer networks.	o Common vulnerabilities o Threats 　▪ Spoofing 　▪ Tampering 　▪ Repudiation 　▪ Information disclosure 　▪ Denial of service 　▪ Elevation of privilege 　▪ Phishing 　▪ Port scan o Attacks 　▪ Hackers and crackers 　▪ Espionage 　▪ Eavesdropping 　▪ Man in the middle attacks 　▪ IP session hijacking o Malware 　▪ Viruses, Worms, Hoxes, Trojans, Spams and Spyware	05
	8.15 Secures networks and information from attack to ensure safety and smooth operation.	o Strong physical security measures o Introduction to software enabled security 　▪ Encrypted communication 　　● Public-key and digital signatures 　▪ Anti-virus software 　▪ Firewalls and proxy servers 　▪ Patches and updates 　▪ Authentication, Passwords/Passphrases 　▪ Access control 　▪ Disable unused interfaces 　▪ Honey pots and sugarcanes	05

Competency	Competency level	Content	Periods
Competency 9: Designs and develops database systems to manage data efficiently and effectively.	9.1 Compares and contrasts different types of database models in terms of their features.	o Database Systems ▪ Flat file system ▪ Hierarchical Model ▪ Network Model ▪ Relational Model ▪ Object Relational Model o Database Systems vs. File Systems	05
	9.2 Illustrates the main components of the relational database model.	o Relations/Tables ▪ Atomicity constraints ▪ Key Constraints ▪ Access by Content Constraints o Attributes/Columns o Tuples / Rows o Relationships	06
	9.3 Analyzes the main components of a database system.	o Databases ▪ Raw data ▪ Indexes o Data Base Management Systems ▪ DBMS kernel ▪ Design tools sub system ▪ Runtime tools sub system ▪ Embedded Programming Language	06
	9.4 Designs the conceptual schema of a database.	o ER diagrams ▪ Entities, Attributes and Entity sets ▪ Entity Identifiers ▪ Relationships and Relationship sets • Cardinality • Degree	06

Competency	Competency level	Content	Periods

	9.5 Designs the logical schema of a database.	o Database Schema Design
		    ▪ Relational schema
		    ▪ Relation instances
		    ▪ Candidate Key
		    ▪ Primary Key
		    ▪ Alternate Key
		    ▪ Foreign Key
		o Relational data integrity
		    ▪ Domain
		    ▪ Reference
		    ▪ Entity
			06

	9.6 Transforms ER diagrams to logical schema.	o Entity Transformation o Attribute Transformation o Relationship Transformation	06

	9.7 Normalizes database schema to improve performance.	o Functional dependencies
		    ▪ Partial dependency
		    ▪ Transitive dependency
		o Modification Abnormalities
		    ▪ Insert
		    ▪ Update
		    ▪ Delete
		o Zero normal form
		o First normal form
		o Second normal form
		o Third normal form
			08

	9.8 Uses Structured Query Language (SQL) to create and manage data in a database.	o DDL	02

Competency	Competency level	Content	Periods

	9.9 Uses SQL to manipulate data in a database.	o DML Features in SQL
		  ▪ Select Query
		  ▪ Insert Query
		  ▪ Update Query
		  ▪ Delete Query
			08

Competency 10:
 	
Develops websites incorporating multi-media technologies.
	10.1 Explores different types of web pages available in the web to get acquainted with their content and structure.	o The World Wide Web (WWW)
		o Types of Web Sites
		  ▪ Information, News
		  ▪ Personal, Educational, Commercial
		  ▪ Web portals
			06

	10.2 Analyzes the structure and the composition of websites to organize pages and content.	o Contents of a website
		  ▪ Home page
		  ▪ Link pages
		o Building blocks of a web page
		  ▪ Text, Graphics, Audio, Visuals
		  ▪ Hyperlink
		o Organization of contents
		  ▪ Formats, Frames, Lists, Tables
			06

	10.3 Uses HTML to create web pages.	o Introduction to Hypertext Markup Language o HTML Standards o HTML Extensions o Insert basic objects to a web page ▪ Text, Graphics, Audio-visuals, Animation	08

Competency	Competency level	Content	Periods

	10.4 Uses advanced features in HTML to enhance web pages.	o Organize objects using advanced features
		    ▪ Create Lists, Tables, Frames, Add Formats
		o Linking multiple web contents
		    ▪ Tags, Pages, Multimedia objects
			08

	10.5 Uses a visual web authoring tool to develop web pages.	o Introduction to IDE o Insert basic objects to a web page o Linking multiple web contents o Organize objects using advanced features ▪ Image Maps, Counters, Forms, CSS	08
	10.6 Publishes and maintains web sites.	o Local Publishing o Intranet Publishing o Connecting to the Web Provider o Publishing web pages on a web server o Factors affecting website performance o Internet and WWW standardization activities.	08

Competency 11:
 	
Explores the systems concept and uses Structured System Analysis and design Methodology (SSADM)
	11.1 Explores Characteristics of Systems.	o Systems concept
		o Classification of systems
		    ▪ Natural systems
		        ● Living and physical systems
		    ▪ Man-made systems
			02

Competency	Competency level	Content	Periods

in developing Information Systems.	11.2 Compares and contrasts different types of manmade systems in terms of their objectives and functionality.	o Information Systems
		o Automated Systems
		    ▪ Office Automation Systems (OAS)
		    ▪ Transaction Processing Systems (TPS)
		o Management Support Systems
		    ▪ Management Information System (MIS)
		    ▪ Decision-Support Systems (DSS)
		    ▪ Executive Support System (ESS)
		o Geographical Information Systems (GIS)
		o Knowledge Management Systems (KMS)
		o Content Management Systems (CMS)
		o Enterprise Resource Planning Systems (ERPS)
		o Expert Systems
		o Embedded Systems
			04

Competency	Competency level	Content	Periods

	11.3 Explores different information systems development models and methods.	o Information systems Models
		  ▪ Waterfall
		  ▪ Spiral
		  ▪ Unified development
		  ▪ Rapid Applications Development
		o Systems development methodologies
		  ▪ Structured
		  ▪ Object oriented
			04

	11.4 Examines the Structured System Analysis and Design methodology.	o SSADM o Phases of the System Development Life Cycle	04

	11.5 Investigates the need for a new information system and its feasibility.	o Preliminary Investigation
		  ▪ Identifying the problems in the current system
		  ▪ Suggesting alternate solutions
		  ▪ Prioritizing Information Systems needs
		o Feasibility Study
		  ▪ Technical feasibility
		  ▪ Economical feasibility
		  ▪ Operational feasibility
		  ▪ Organizational feasibility
			05

Competency	Competency level	Content	Periods

	11.6 Uses vivid methods to analyze the current system.	o Requirements
		    ■ Functional Requirements
		    ■ Non functional requirements
		 o Analytical Tools
		    ■ Activity diagrams
		    ■ Document flow diagrams
		    ■ Data flow diagrams for current system
		 o Business system options
			05

	11.7 Designs the proposed system.	o Logical Design
		    ■ Data flow diagrams for proposed system
		    ■ Architectural design
		    ■ Logical data structures
		 o Process specification
		 o Data dictionary
		 o Interface design
			05

	11.8 Develops and tests the proposed system.	o Program Coding
		 o Testing
		    ■ Test cases
		    ■ White box testing
		    ■ Black box testing
		    ■ Unit testing
		    ■ Integrated testing
		    ■ System testing
		    ■ Acceptance testing
			05

Competency	Competency level	Content	Periods

	11.9 Implements the developed system.	o Implementation
		  ▪ Parallel
		  ▪ Direct
		  ▪ Pilot
		  ▪ Phase
		o Review, Support and Maintenance
			04

Competency 12:
 	
Explores applicability of ICT to today's business organizations and the competitive marketplace.
	12.1 Explores the role of ICT in the world of business.	o Digital economy
		  ▪ New business methods in digital economy
		    • Reverse Auctions
		    • Group purchasing
		    • e-Marketplace
		o Pure brick, brick and click, and pure click organizations
		o Business functions and the role of IT
		  ▪ Accounting and IT
		  ▪ Human Resource and IT
		  ▪ Production and IT
		  ▪ Marketing & sales and IT
		  ▪ Supply chain management and IT
		  ▪ Business communication and IT
			05

Competency	Competency level	Content	Periods
	12.2 Analyses the relationship between ICT and business operations.	o e-Commerce and e-Business ▪ The scope of eCommerce and e-Business ▪ Types of e-Business transactions ▪ B2B, B2C, C2C, C2B, B2E, G2C o e-Business ▪ Virtual Storefronts ▪ Information Brokers ▪ Online Marketplace ▪ Content Provider ▪ Online Service Provider ▪ Portal ▪ Virtual Community o Advantages and disadvantages of e-Business	05
	12.3 Analyses the IT means of generating and delivering an improved products and services to consumers..	o e-Marketing ▪ Philosophy of marketing ▪ Web advertising ▪ Use of information technology in customization o Database marketing ▪ Predicting customer behaviour with AI tools and techniques ▪ Gaining competitive advantages through IT	05

Competency	Competency level	Content	Periods
Competency 13: Explores new trends and future directions of ICT.	13.1 Explores new trends and future directions in computing.	o Intelligent and emotional computing o Artificial Intelligence o Kansei systems • o Man-machine coexistence	04
	13.2 Explores the fundamentals and applications of Agent Technology.	o Software Agents o Multi-Agent systems o Applications of Agent systems	04
	13.3 Explores the fundamentals and major applications of Evolutionary computing.	o Evolutionary computing o Computing in biological systems o Fundamentals of Genetic Algorithms o Applications of evolutionary computing	04
	13.4 Explores the concept of Ubiquitous computing.	o Ubiquitous computing o Technologies for ubiquitous computing o Applications of Ubiquitous computing	04
	13.5 Analyzes the existing models of computing and propose new models.	o Beyond von-Neumann computer o Nature inspired computing o Fundamentals of Quantum Computing o Applications	04

Competency	Competency level	Content	Periods
Competency 14: Designs and Implements a simple Information System as the Project.	14.1 Conducts projects on designing Information systems.	**Phase I :** Definition of Information Systems **Guide lines** 1. Project formulation including initial reading/study, discussion with teacher to decide on the project 2. Prototype Design and Implementation 3. Demonstration and Presentation during the Second Semester (Grading)	**One period per week for a duration of one year**
	14.2 Implements and demonstrates the Information System.	**Phase II :** **Guide lines** 1. Full Implementation of the Project Approved in Phase I 2. Presentation and Demonstration	

4.0 Learning Teaching process

Information and Communication Technology is not only a dynamic subject, it is also a living subject. It is necessary to update one's knowledge in order to be alert to the latest findings in this area. ICT has taken such an important position that the percentage of literacy in ICT has come to be regarded as an index of development. It is essential that the proposed method of teaching should be student-centred as this subject is essentially practice-oriented. In view of the fact that this is an essentially practical subject it is vital that a student is involved in self study apart from the day to day learning- teaching process in order to ensure that subject matter learned is firmly grasped. There is need for special attention to be paid to the encouragement of the student for self-study. Further, just as much as knowledge, attitudes and skills, as well as social values, legal constraints related to the subject carry with them the imperatives of a sense and spirit of self-discipline. It is essential that the learning-teaching evaluation process is so organized as to highlight the importance of computer use.

The global trend in present day education is to introduce competency-based curricula, which promote collaborative learning through student centred activities where learning predominates teaching. It is intended for the students to actively participate in activities, which enhance the development of individual social and mental skills. The following aspects are emphasized.

1.   It is advised to cover the content through 5E-model activities as far as possible.
2.   Allow the students to acquire hands on experience through self-directed activities.
3.   Direct students to acquire knowledge and information through reliable sources wherever necessary.

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5.0   School Policies and Programmes

It needs to be noted at the onset, that the success of the classroom learning-teaching process has an immense bearing on the effective actualization of the expected aims of the subject Information and Communication Technology. Therefore, it is important that the school policy and programs are organized in keeping with these expectations. It is important, in the achievement of the aims of this subject that the novelty of the subject and the consequent paucity of knowledge regarding this subject in student, should be taken into consideration.

The number of periods available for this subject is 300 per year. However, the number of periods in this revised syllabus is 441 for the both academic years and this includes practical sessions for the appropriate competency levels. Apart from the above, 30 periods are set apart, spread throughout the year, for the Project in Grade 13.

Practical sessions are so important, as student should know how to apply what they have learnt and experienced throughout this learning activities.   In order to acquire a main competency as included in the syllabus students are required to practice some graded exercises followed by one or more real world applications.

Students have to maintain an activity logbook to record their activities done during this practical session and should be presented to the teacher in charge to maintain its correctness and consistency.

The individual project to be assigned in Grade 13 should be implemented outside normal classroom sessions. Thirty periods, however, will be devoted for teacher led discussions plus practicals at different stages of the project. For the success of this activity, which comprises only individual practical works, arrangement will have to be made for the students to use the computer laboratory even outside the timetabled sessions.

6.0 Assessment and Evaluation

It is intended to implement this syllabus in schools with the School Based Assessment (SBA) process. Teachers will prepare creative teaching-learning instruments on the basis of school terms.

The details together with the format and the nature of questions will be introduced by the Department of Examinations.