Information and Communication Technology

Grade 11

(2021)

Essential Contents

Information & Communication Technology

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Essential Contents (Grade 10 & 11)

Instructions for teachers:

- **Following table contains, the essential subject contents of grade 11 students to be followed to accomplish the syllabus**
- **Guide students to use the "GuruGedara" programme and "e-thaksalawa" learning approaches to enhance the subject knowledge**
- **Provide adequate ICT infrastructures for students those who have difficulties to reach "GuruGedara" and "e-thaksalawa"**

Competency	Competency Level	Content	Learning Outcome	Learning Approach		
				Class room Periods	**Gurugedara Programme**	**E-Thaksalawa**
1. Investigates the methods used to represent data in computer systems	1.1 Uses the binary number system to represent data in computer systems	● Methods of data representations ○ 1 and 0 to represent two states ● Decimal, Binary, Octal and Hexa-decimal number systems	● Explains that data can be represented using two states ● Represents positive decimal integers in binary	01	https://www.youtube.com/watch?v=mXwh11Rg16E&t=75s	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si
	1.2 Conversion of Number Systems	● Methods for conversions (positive integers only) ○ Decimal to Binary, Octal and Hexa-decimal	● Converts Decimal to Binary, Octal, and Hexa-decimal ● Converts Binary to Decimal, Octal and Hexa-decimal ● Converts Octal to Hexa-	01	https://www.youtube.com/watch?v=zHCkYKQmoVE&list=P	https://www.e-thaksalawa.moe.gov

		o Binary to Decimal, Octal and Hexa-decimal o Octal to Hexa-decimal (Vice versa)	decimal (Vice versa)		Llyv4_Vxwl-zQl5W7b7uusOry61renXvi	.lk/moodle/course/view.php?id=563&lang=si
	1.3 Determines the capacity of data storage	● Units of measurement: Bit, Byte, KiloByte, 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	01	https://youtu.be/4xtyeKGDAFs?list=PLlyv4_Vxwl-zQl5W7b7uusOry61renXvi	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si
	1.4 Explores coding systems in computers	● BCD ● ASCII ● Unicode	● Explains how different coding systems are used ● Explains limitations of each system	01	https://www.youtube.com/watch?v=4xtyeKGDAFs	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si

2. Uses Boolean logic to work effectively with logic gates	2.1 Identifies basic logic operators and draws truth tables to illustrate their functions	● Operators: AND, OR, NOT, NOR, NAND ● Introduction to Truth Tables (maximum of three inputs)	● Explains the action of logic gates ● Draws truth tables for logic operations	02	https://www.youtube.com/watch?v=pHWmn07UqCg	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si
	2.2 Applies concepts of Boolean logic to find solutions to simple day-to-day life problems	● Design of logic for simple real world applications 　○ Alarm systems 　○ 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	03		
3. Works effectively with Operating System	3.1 Explores operating systems by type, functions, benefits and concerns	● Introduction to OS ● Types of operating systems: single user, multi user, real time ● Functions of the OS: User interface and resource management ● Benefits of the OS ● Utilities of an OS: Partitioning, Formatting, Defragmentation	● Describes the need for an operating system ● Briefly explains functions of an operating system ● Briefly explains utilities of an operating system	02		https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si

	3.2	Handles files and folders in Operating Systems	● Introduction to the file 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 need
					02	

4. Uses Word processing Software to Solve Day-to-day problems	4.1	Explores the concept and features of word processing	● Functions of word processing software ● GUI of word processing software	● Discusses facilities of word processing software ● Explores GUI of word processing software	01	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si
	4.2	Performs basic tasks in word processing software	● Creating new documents ● Page setup: Paper size, margins, orientation ● Spelling and grammar checking ● Find and replace of text ● Opening existing documents ● Saving and closing of documents	● Creates new documents ● Checks spelling and grammar of a document ● Opens existing documents ● Saves and closes documents	01	
	4.3	Uses different types of formatting in word processing	● Formatting text ● Graphics: Insertion and formatting ● Shapes : Insertion and formatting	● Applies suitable text formatting ● Manipulates graphics and draws simple shapes	01	

	4.4 Manipulates table feature in word processing software	● Insertion of tables ● Column width and height ● Deletion, insertion, splitting and merging of cells	● Creates tables to insert data ● Formats tables ● Edits tables	01		
	4.5 Creates and prints documents	● Selection of printer ● Print options: Copies and page range	● Prints documents with necessary settings			
5. Uses Spreadsheet to solve simple statistical problems	5.1 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	01	https://youtu.be/vtjeOXVuRiI?list=PLIyv4_Vxwl-zQl5W7b7uusOry61renXvi	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si
	5.2 Moves around the worksheet to gain hands on experience of data entry	● Worksheet, columns, rows and cells ● Data entry (label, number, formulae) ● Decimal places (increase and decrease)	● Identifies components of a worksheet ● Enters and edits data ● Sets decimal places according to requirements	01		
	5.3 Performs basic mathematical operations	● Simple calculations using cell addresses and operators (+, -, *, /,^)	● Carries out calculations using basic operators ● Uses cell references in calculations	01		
	5.4 Uses inbuilt functions for calculations	● SUM, AVERAGE, MAX, MIN, COUNT	● Identifies functions and its parameters ● Uses basic built-in functions in calculations	01		
	5.5 Uses relative	● Absolute and Relative cell	● Explains relative and absolute	01		

	versus absolute cell references appropriately	references	addressing mode ● Uses both modes appropriately in calculations			
	5.6 Creates charts using Spreadsheet to explain data	● Charts: ○ Chart types (Bar, column, line and pie) ○ Chart options	● Present data using suitable built in chart types	01		
6. Uses Presentation software to develop electronic presentations.	6.1 Produces effective presentations integrating multimedia	● Introduction to presentation software ● Changing Background, Slide layout, Slide designs ● Inserting text and multimedia	● Applies good practices in the use of presentation software ● Formats slide layout ● Inserts text, images, movies and sounds	01	https://www.youtube.com/watch?v=KuGZWON_vQk	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si
	6.2 Applies suitable animations to enhance the quality of presentations	● Slide transitions ● Custom animation	● Applies suitable screen transitions ● Applies suitable animations on screen objects	01		
7. Develops simple databases to elicit information	7.1 Explores the Concept of Database	● Introduction to database ● Definition of a database ● Manual and electronic databases: ● Advantages of electronic databases	● Discusses nature and advantages of databases ● Explains the features of electronic databases	01	https://youtu.be/hfbU3-GtRKs?list=PLIyv4_Vxwl-zQl5W7b7uusOry61renXvi	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si

	7.2 Converts a manual database into electronic media	● Creation of a database using DBMS software ● Field name, unique field, data types, field size	● Creates databases using DBMS software ● Select suitable fields to create data tables	01		
	7.3 Design a simple relational database	● Tables, fields and key fields: Primary key, foreign key, relationships ● Creation of relationship between tables manually ● Creation of relationship between tables electronically	● Designs simple relational database ● Identifies primary and foreign keys ● Designs simple relational databases electronically ● Implements relationships	03	https://www.youtube.com/watch?v=DLYDcxDjXXo	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si
	7.4 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	02	https://www.youtube.com/watch?v=L-sKQcNMuy4&t=436s	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si
	7.5 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	01		
	7.6 Creates reports to present information	● Use of report Wizard ● Printing of reports	● Creates reports for given purposes ● Prints reports	01		

8. Writes programs to solve problems	8.1	Analyzes the problem	● Identification of inputs and outputs ● Identification of possible alternate process steps	● Identifies inputs and outputs ● Explores solutions	01	https://youtu.be/bY8TQstuZKA?list=PLlyv4_Vxwl-yStpiBL7HVK5VviZTtz4UB	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=700&lang=si

	8.2	Uses different tools to present algorithms	● Introduction to algorithms: purpose
			● Tools for developing algorithms
			  o Flow charts
			  o Pseudo codes
			●Conversion of flowcharts in to pseudo codes
				● Explains purpose of algorithms
				● Identifies symbols of flow charts
				● Explains structure of pseudo code
				● Draws flow charts to represent algorithms
				● Converts flow charts to pseudo code
					02	https://youtu.be/kERMjXIQJWI?list=PLlyv4_Vxwl-yStpiBL7HVK5VviZTtz4UB	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=700&lang=si

	8.3	Uses control structures in developing algorithms to solve problems.	●Control structures for developing algorithms
			  o Sequence
			  o Selection
			  o Iteration (Repetition)
				●Describes control structures
				● Applies control structures to develop algorithms
					02	https://youtu.be/nSMgJCCU5bI?list=PLlyv4_Vxwl-yStpiBL7HVK5VviZTtz4UB	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=700&lang=si

| | 8.4 | Uses data types in programming | ● Identifiers, reserved words and keywords in a computer programming language
● Variables and constants in computer programming
● Description of data types
  o Purpose of data types
  o Use of meaningful names for identifiers
● Basic Data Types:
  o Numeric (integer, floating point)
  o Character
  o Logical | ● Declares identifiers using correct data types

● Uses variables effectively in programs | 02 | https://youtu.be/Xxetm5XaAgE?list=PLIyv4_Vxwl-yStpiBL7HVK5VviZTtz4UB | https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=700&lang=si |
| | 8.5 | Uses operators in programming | ● Purpose of operators
● Basic operators
  o Arithmetic operators
  o Comparison operators
  o Logical operators: AND, OR, NOT
● Operator precedence
● Expressions | ● Selects correct operators in computations
● Applies operators effectively in programs
● Evaluate results of expressions | 02 | https://youtu.be/Xxetm5XaAgE?list=PLIyv4_Vxwl-yStpiBL7HVK5VviZTtz4UB | https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=700&lang=si |

				02	https://youtu.be/GlY-PrtA9YA	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=700&lang=si
	8.6 Develops programs involving selection control structure	● IF-EndIf and If-Else-EndIf statement ● Use of Switch/ case when single variable has multiple conditions ● Conversion of flow charts into pseudo codes and subsequent coding into a programming language	● Identifies correct selection control structure ● Identifies correct selection condition ● Uses selection control structure in programs ● Combines selection control structures to meet programming needs			

	8.7 Develops programs involving basic iterations	● Use of iterations (repetitions) in:
		  o Cases where the number of iterations are known
		  o Cases where the number of iterations are unknown
		● Checking of the condition for iterations
		  o Beginning of the iteration
		  o End of the iteration
		● Conversion of flow charts into pseudo codes and subsequent coding using a programming language
			● Identifies correct iteration structure
			● Applies correct condition to control iterations
			● Uses iteration control structure in programs.
				02	https://youtu.be/MNFdYdjO0XI?list=PLlyv4_Vxwl-yStpiBL7HVK5VviZTtz4UB
					
					https://youtu.be/rAwB856qMKA
						https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=700&lang=si

9. Explores the Systems Development Life Cycle of information system development.	9.1 Describes the concept of an information system	● Definition of a system
		● Components of a system
		  ○ Input
		  ○ Process
		  ○ Output
		● Manual systems
		● Computer based systems
		● Information systems
		  ○ Importance of Information in decision making
		  ○ Inputs, outputs, dataflows and processes
			● Describes an information system.
			● Identifies the relationship between the components of an information system.
			● Explains the significance of an information system.
				01		

	9.2 Explains the Systems Development life cycle.	● The system development life cycle
		  ○ Identification of requirements
		  ○ Design of the solution
		  ○ Implementation of the solution
		  ○ Testing of the solution
		  ○ Deployment of the solution
		  ○ Maintenance of the system.
		● Difference between phased system development life-cycle and iterative incremental life-cycle
			● Describes the stages in system development.
			● Provides examples of each stage.
				01		

10. Uses the Internet for information search and communication effectively	10.1 Uses the Internet to access information	● Introduction to the Internet: URL, IP address and domain names ● Functions of the Internet: Email, WWW, ftp, remote access, file sharing, streaming of media, cloud computing, search engines ● Domain name server and its purpose	● Describes the operation of the Internet ● Explains the services of the Internet ● Uses the services to obtain information	01		https://www.e-thaksalawa.moe.gov.lk/content/sinhala/sg11/ict/sg11_ict_chap3_internet/content.html
	10.2 Uses the Internet for communication	● Email accounts: Sending and receiving mails- to, from, bcc and cc, attachments, subject ● Instant messaging services	● Communicates via Email accounts ● Describes basic communication facilities available on the Internet	02		
11. Develops websites incorporating multimedia technology	11.1 Structures information for development of websites	● Contents for websites ● Analysis of the purpose and the audience ● Organization of the content/ messages ● Design of the layout and structure: scheme, color, font ● Selection of media assets ●Web authoring tools - Introduction	● Identifies user needs of the website ● Designs websites according to specifications	01	https://youtu.be/gqeEL_DojIk?list=PLlyv4_Vxwl-yStpiBL7HVK5VviZTtz4UB	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=700&lang=si
	11.2 Uses HTML basics	● Difference between hypertext and normal text ● Features of HTML	● Explains the use of basic tags in HTML ● Creates web pages using	02	https://youtu.be/a2JBfXBTXEo?list=PLlyv4_Vx	https://www.e-thaksalaw

		● HTML document structure – Head, Title, body
		● HTML basics
		  o Line and paragraph breaks
		  o Text: format and color
		  o Insertion of images
		  o Use of hyperlinks
		  o Lists
		  o Tables
			HTML		wl-yStpiBL7HVK5VviZTtz4UB
					
					https://youtu.be/hudfqtON51s?list=PLlyv4_Vxwl-yStpiBL7HVK5VviZTtz4UB
						a.moe.gov.lk/moodle/course/view.php?id=700&lang=si

12 Compares and contrasts benefits and issues related to ICT in society	12.1 Explores the contribution of ICT to Business	● e-Business
		  o Internet based (on-line) shopping
		  o Internet based (on-line) Share market transactions
		  o Safety measures
		● Advertising
			● Explains use of the Internet in business
			● Explains the use of ICT in advertising
				01		

	12.2 Assesses issues related to ICT with respect to ethical and legal aspects	● Legal Issues
		  o Intellectual property: Copyright, patents and piracy
		  o Privacy
		● Ethical issues:
		  o Fair use
		  o Plagiarism
		● Precautions to be taken in social media
			● Explains legal issues in the use of ICT
			● Explains ethical issues in the use of ICT
				01	https://youtu.be/jG_TX6XPVpc?list=PLlyv4_Vxwl-yStpiBL7HVK5VviZTtz4UB	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=700&lang=si

	12.3	Explores issues and precautions related to ICT infrastructure protection	• Physical Security
			  o UPS
			  o Restricted access via door-locks
			  o lightning protectors
			  o surge protectors
			• Environmental factors
			  o dust
			  o humidity
			  o temperature
			• Logical Security
			  o Passwords
			  o Firewalls
			  o Backups
			  o Protection against malware: spam, virus, key-loggers
			• Institutions for information security of Sri Lanka
				• Identifies security issues
				• Takes precautions to eliminate or minimize security threats
					02	https://www.youtube.com/watch?v=jG_TX6XPVpc	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=563&lang=si

	12.4	Investigates health and safety issues inherent in the use of ICT	• Ergonomics and Health issues- Repetitive Strain Injury: Eye-strain, backaches • E-waste: Hazardous elements and its impact on the environment • Safe disposal and destruction of electronic equipment	• Explains basic health and environmental issues associated with the use of computers • Explains the precautions to be taken in the use of computers • Explains safe disposal methods of electronic equipment	01	https://youtu.be/zspNVWM2r8U?list=PLlyv4_Vxwl-yStpiBL7HVK5VviZTtz4UB	https://www.e-thaksalawa.moe.gov.lk/moodle/course/view.php?id=700&lang=si
				Total	**60**		

Low Prioritized Contents of Grade 11

Competency	Competency Level	Content	Remarks
10. Writes programs to solve problems	10.8 Develops programs with nested control structures	- The purpose of using nested control structures - Use of control structures within another control structure - Selection within selection - Iteration within iteration - Iteration within selection - Selection within iteration - Conversion of flowcharts into pseudo codes and subsequent coding into a programming language	After introducing this syllabus, all the question papers of the past years contained very few questions from these subject areas as well as those questions were multiple choice or short questions,therefore these sections were selected as low prioritised content
	10.9 Develops programs using one dimensional arrays.	- The purpose of the use of arrays - Definition of the one dimensional array - Properties of an array - Index - Contiguous locations - Random access - Array Operations - Declaration - Accessing values - Assignment of values	To save time spent teaching in the classroom encourage students to study the above mentioned low prioritised content and theoretical parts by using "Gurugedera", "e-taksalawa", textbooks, the Internet,tutorials, etc. out of the classroom periods.

	10.10 Structures programs through sub-programs	• The purpose of the use of sub-programs
		  • Improvement of code reusability,
		  • Readability , ease of testing
		  • Maintainability
		• Types of subprograms: value returning and not returning
		• Structuring of programs using subprograms
		  • Development of basic programs with a single sub-program	

	10.11 Explores the evolution of programming languages.	• Low-level languages
		  • Machine language
		  • Assembly language
		• High-level languages
		• Types of high-level languages:
		  • Procedural vs Declarative
		  • Structured vs Object oriented
		  • Programming vs scripting
		• Methods used to convert source code to machine code
		  • Interpreters
		  • Compilers
		  • Testing and debugging	

13. Develops Multimedia contents to express ideas effectively.	13.1 Creates effective still graphics using suitable graphic software.	• Digital image elements: pixel, resolution, size, color
		• Image capacity and compression: lossy formats and lossless formats
		  • Image types: raster and vector
		  • Graphic types: raster and vector
		  • Working knowledge of graphic software to perform the following basic operations
		  • Open, save and edit	

		• Importing images • Sizing and transformation • Selection, cut, crop, replace • Working with layers • Text editing and effects

	13.2 Creates effective 2D animations using suitable 2D animations software	• Animation basics: Layers, frames, timing, frame rate
		• Geometrical objects and shapes
		• Frame types: frame, key frame, initial frame, destination frame, blank key frame.
		• Animations
		  • Frame by frame animation
		  • Basic Tweening
		• Publishing

	13.3 Edit Audio and video contents using suitable software	• Recording audio content. • Editing (extracting a relevant segment from original content)
	13.4 Effectively integrates multimedia contents	• Integration of background images with animations • Integration of audio and video

14. Develops websites incorporating multimedia technology.	14.3 Develops web sites using web development tools	• Web authoring tools
		• Text Formatting
		• Page Layout
		• Use of Multimedia building blocks: text, graphics, audio and video
		• Hyperlinks
		• Methods of web development
		  • Static vs dynamic webs
		  • Content managed web development
		• Content Management Systems (CMS)

		• The purpose of the process of CMS based web development: • Work-flow and roles in CMS • Content creation, editing, publishing, and use • Roles: Creator, editor, publisher, administrator, user	
	14.4 Demonstrates preparedness to publish web sites	• Internet Service Providers for Web hosting: • Maintenance of a website	
15. Compares and contrasts benefits and issues related to ICT in society	15.1 Investigates the contribution of ICT to the health sector	• ICT in Health services o Tele Medicine o Tele monitoring • Computer controlled medical equipment o Computer Axial Tomography (CAT) scanner o Magnetic Resonance Imaging • Maintenance of medical history records. o Clinical history o Medication • Test reports	This section completes by Grade 10 Competency 1
	15.2 Investigates the contribution of ICT to education	• ICT Assisted Learning (e-learning) o Interactive teaching and learning material o Web-based learning • Learning Management Systems (LMS) • School Management Information Systems	
	15.3 Investigates the contribution of ICT to agriculture	• Computer controlled agricultural equipment : Green houses • Information searching on agriculture • Virtual competitive market for agricultural products • Optimization of agricultural productivity	

		• Detection and control of pests • Optimization of fertilizer use • Weather prediction	
	15.4 Investigates the usage of ICT in different industries.	• Architecture: ComputerAided Design(CAD) • Manufacturing - Computer Aided Manufacture (CAM)/Computerized machines in production • Production - Robotic	
	15.6 Explores the contribution of ICT to Entertainment	• Movies and cartoon production • Digital sound editing • Games • Simulations	
	15.10 Assesses issues associated with ICT and society.	• Digital divide • Digital bridge • De-skilling • Techno-rich employment • Equal Opportunities	