



KEMENTERIAN PELAJARAN MALAYSIA

**HURAIAN SUKATAN PELAJARAN
KURIKULUM BERSEPADU
SEKOLAH MENENGAH**

INFORMATION AND COMMUNICATION TECHNOLOGY



Pusat Perkembangan Kurikulum
Kementerian Pelajaran Malaysia
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RUKUN NEGARA

BAHAWASANYA negara kita Malaysia mendukung cita-cita untuk mencapai perpaduan yang lebih erat di kalangan seluruh masyarakatnya; memelihara satu cara hidup demokratik; mencipta masyarakat yang adil bagi kemakmuran negara yang akan dapat dinikmati bersama secara adil dan saksama; menjamin satu cara yang liberal terhadap tradisi kebudayaannya yang kaya dan berbagai-bagai corak; membina satu masyarakat progresif yang akan menggunakan sains dan teknologi moden;

MAKA KAMI, rakyat Malaysia, berikrar akan menumpukan seluruh tenaga dan usaha kami untuk mencapai cita-cita tersebut berdasarkan prinsip-prinsip yang berikut:

KEPERCAYAAN KEPADA TUHAN

KESETIAAN KEPADA RAJA DAN NEGARA

KELUHURAN PERLEMBAGAAN

KEDAULATAN UNDANG-UNDANG

KESOPANAN DAN KESUSILAAN

FALSAFAH PENDIDIKAN KEBANGSAAN

Pendidikan di Malaysia adalah suatu usaha berterusan ke arah lebih memperkembang potensi individu secara menyeluruh dan bersepadu untuk melahirkan insan yang seimbang dan harmonis dari segi intelek, rohani, emosi, dan jasmani, berdasarkan kepercayaan dan kepatuhan kepada Tuhan. Usaha ini adalah bertujuan untuk melahirkan warganegara Malaysia yang berilmu pengetahuan, berketerampilan, berakhlak mulia, bertanggungjawab dan berkeupayaan mencapai kesejahteraan diri serta memberikan sumbangan terhadap keharmonian dan kemakmuran keluarga, masyarakat dan negara.

KATA PENGANTAR

Huraian Sukatan Pelajaran *Information and Communication Technology (ICT)* ialah dokumen yang memperincikan Sukatan Pelajaran yang bertujuan untuk memenuhi cita-cita murni dan semangat Falsafah Pendidikan Kebangsaan dan menyediakan murid menghadapi arus globalisasi serta ekonomi berasaskan pengetahuan pada abad ke-21.

Dokumen ini menghurai dan mengembangkan kandungan serta menyarankan strategi pengajaran dan pembelajaran yang merangkumi pelbagai aktiviti dan penggunaan sumber. Di samping itu, huraian ini memberi hala tuju dan panduan untuk mengoptimumkan hasil pembelajaran yang dihasratkan. Guru digalakkan menggunakan kreativiti untuk memilih, menyusun dan mengolah aktiviti mengikut kesesuaian murid. Huraian ini diharapkan dapat membantu guru merancang dan melaksanakan pengajaran dan pembelajaran secara berkesan.

Dalam melakukan aktiviti pengajaran dan pembelajaran, guru diharap akan dapat memberikan penekanan pada unsur bernilai tambah, iaitu kemahiran berfikir, kemahiran teknologi maklumat dan komunikasi, kemahiran belajar cara belajar, kajian masa depan, kecerdasan pelbagai, pembelajaran kontekstual, dan pembelajaran konstruktivisme. Di samping itu, nilai murni dan semangat patriotik dan kewarganegaraan tetap diutamakan. Semua elemen ini diharap dapat memberikan keyakinan kepada murid dan boleh diaplikasi dalam kehidupan harian dan dunia pekerjaan.

Usaha menyempurnakan Huraian Sukatan Pelajaran ICT ini melibatkan banyak pihak iaitu pensyarah universiti, pensyarah maktab, guru, pegawai Kementerian Pelajaran, dan tenaga pakar dari sektor swasta.

Akhir kata Kementerian Pelajaran Malaysia merakamkan setinggi-tinggi penghargaan dan terima kasih kepada semua pihak yang telah memberikan sumbangan kepakaran, masa dan tenaga sehingga terhasilnya Huraian Sukatan Pelajaran ICT ini.

(MAHZAN BIN BAKAR AMP)

Pengarah

Pusat Perkembangan Kurikulum
Kementerian Pelajaran Malaysia

INTRODUCTION

Information and Communication Technology (ICT) is a powerful medium that has become increasingly important to society. The introduction of ICT as an elective subject in Malaysian secondary schools will provide a valuable training ground for students. This will help students relate their ICT learning experiences to a progressive technology-based daily life. The curriculum provides a platform for producing a technologically capable work force. This will help meet the challenges of a global economy.

This subject is offered to all Form 4 and Form 5 students. It aims to provide them with the knowledge, skills and values from several designated learning areas. It will also prepare them for the *Sijil Pelajaran Malaysia* (SPM) examination.

THE CURRICULUM SPECIFICATIONS

Suggested activities are incorporated as part of the teaching-learning strategy. It should be borne in mind that teachers are also encouraged and expected to employ other effective strategies in line with the needs of the target group.

What is it?

The Curriculum Specifications is a document that contains detailed explanations of the basic information required within the subject curriculum. It is designed as a teaching guide to help the teacher interpret and

implement the Information and Communication Technology (ICT) syllabus in the classroom.

Who is it for?

This document is intended for ICT teachers teaching the ICT subject at the Upper Secondary Level (Form 4 and Form 5) of the *Kurikulum Bersepadu Sekolah Menengah* (KBSM).

What are the Learning Areas?

The six learning areas are as follows:

- Information and Communication Technology and Society
- Computer Systems
- Computer Networks and Communications
- Multimedia
- Programming
- Information Systems

What information does it contain?

The ICT Curriculum Specifications contains the following information:

- The various topics and recommended duration of each topic
- The learning outcomes of each topic which describe the skills to be acquired by students at the end of the allotted time

- Suggested activities for each topic. Teachers are free to select any or all of the recommended activities or to design their own

The topics may be taught in any sequence without compromising the quality of the curriculum. The teacher is not confined to follow the order in which the topics are set out in this document.

RECOMMENDED APPROACHES AND STRATEGIES FOR TEACHING AND LEARNING

Appropriate teaching and learning approaches and strategies are important for the achievement of the learning objectives set out in the curriculum specifications. The teacher acts as an instructor or a facilitator depending on the types of activities and the learning outcomes.

Teaching Approaches

Information and Communication Technology (ICT) lessons should be conducted using the teaching approaches stated below.

The Knowledge-Based Approach

The knowledge-based approach in this curriculum requires the teacher to act as an instructor. The teacher is required to:

- introduce the field of study in terms of concept, definition and terminology

- show and demonstrate the various software, hardware and devices used in the learning areas
- provide instructional guidance which will form the fundamental basis for students to grasp the content of the syllabus
- encourage students to seek other sources of information and reference, and to conduct independent study whenever necessary

The Skill-Based Approach

The skills-based approach emphasizes student-centred activities with the teacher providing explanations and guidance whenever needed. As such, the teacher plays the dual role of instructor and facilitator, and should:

- provide hands-on guidance to students to help them acquire relevant skills in each learning area
- guide students on standard operating procedures involved in the various learning areas
- encourage students to work systematically

The Task-Based Approach

Task-based activities are almost completely student-centred. The teacher's role here will involve:

- providing advice on project management procedures and task organization
- monitoring the progress of student projects
- giving advice, tips and recommendations whenever needed
- evaluating the outcome of students' work

Learning Strategies

The Self-Directed, Self-Accessed, Self-Assessed and Self-Paced strategies (SeDAAP) are introduced within this document.

The SeDAAP strategy is designed to encourage students to take responsibility for their own learning and to develop self-reliance and self-confidence within the parameters of the assignments given. This strategy encourages the development of independent learners, facilitates the forging of productive work relationships among group members and also serves to foster student discipline.

Self-Directed Learning

In self-directed learning, students determine the topics they want to learn within a particular content area.

Self-Accessed Learning

In self-accessed learning, students search for and locate information about specific topics from a variety of sources not supplied by the teacher. These information sources may include reference books, magazines, CD-ROMs, the Internet, resource centres and libraries.

Self-Assessed Learning

In self-assessed learning, students are encouraged to evaluate their own progress within a particular topic. This evaluation can be based on value judgements, self-reflection or observation as well as on criteria lists

or evaluation rubrics provided by the teacher. If students decide that a particular topic or skill has been satisfactorily learned, they can then move on to another topic.

Self-Paced Learning

In self-paced learning, students determine their own pace in acquiring the prescribed knowledge and skills in the various content areas within the syllabus. This strategy encourages step-by-step learning in which students monitor their own progress.

CURRICULUM CONTENT

The curriculum emphasizes the integration of **knowledge, skills and values**.

Knowledge

The knowledge to be acquired in the ICT curriculum consists of concepts and facts about ICT as well as ICT terminology. It includes procedures in managing computer systems, sequential processes in developing products, and programming commands and syntax. It also integrates discussions on current issues related to ICT and their implications for the future.

Skills

The skills involved are communication skills, information management skills, managing computer systems and problem-solving skills.

The details of each skill are as follows :

Communication Skills

Communication skills refer to the process of gaining and disseminating information verbally or non-verbally. These involve:

- Information sharing and dissemination
- Production through various means including graphic presentation, sketching and proto-typing using information technology
- Identifying, elaborating on and interpreting various points of view
- Exploiting, accessing and processing technologies with confidence and competence
- Ensuring security of information distribution

Information Management Skills

Information Management Skills provide opportunities to develop information by:

- maintaining the integration of information
- using various inquiry techniques
- identifying, searching, collecting, saving, accessing and processing information
- categorising, analysing, synthesising and evaluating information

- Presenting information clearly, logically, accurately and precisely

Managing Computer Systems

This involves the use of computer hardware and software for communications and problem-solving, including the ability to identify, assemble, arrange and maintain the computer systems.

Problem-Solving Skills

Problem-solving skills provide opportunities for students to apply ways and strategies to real-life problems. These skills emphasize the following:

- Logic and programming
- Critical, creative, reflective and mantic thinking
- Imaginative, initiative and flexibility
- Identification, description, and re-interpretation of problems and analysis from various perspectives
- Investigation, exploration and generation of ideas
- Problem-testing and solutions
- Making decisions based on experience and sound rationale
- Process and product evaluation

Values

The values in the ICT syllabus are diligence, accuracy, precision, confidence, responsibility, integrity, respect, cooperation, appreciation, courtesy and abiding by the ICT Code of Ethics.

SCHOOL REQUIREMENTS FOR OFFERING THE ICT SUBJECT

Schools which intend to offer this subject must fulfil the requirements outlined below:

Physical Facilities/Infrastructure

- A fully-equipped computer laboratory with direct access to the Internet, with at least 20 workstations and one server
- The ratio is one computer to one student.

Workstations

- Multimedia PC, minimum Pentium 3 or equivalent microprocessor with a minimum speed of 700 MHz.
- A minimum RAM of 128 MB
- At least 10 GB of free space hard disk drive
- Operating system: Minimum requirements - Windows98/Linux base

Local Area Network (LAN)

- All computers must be networked using the TCP/IP communications protocol with a minimum data transfer rate of 10 MB per second.

Server

- Minimum Pentium 3 or equivalent microprocessor.
- Minimum speed of 933 MHz
- A minimum RAM of 256 MB
- HDD of at least 40 GB
- Operating system: Minimum requirements - Windows NT /Windows 2000 Server/Linux base

Digital Camera and Digital Video Camera

- At least one workstation in the computer lab should be equipped with a Video Capture Card
- At least one digital camera
- At least one digital video camera

Scanner

- At least one scanner

Computer Software (*Standard software provided by Ministry of Education*)

- Word processor: Microsoft Word/Open office.org.writer
- Electronic Spreadsheet: Microsoft Excel/ Open office.org.calc
- Presentation Software: Microsoft PowerPoint/ Open office.org.impress

- Database: Microsoft Access
- Programming Tool: Microsoft Visual Basic
- Authoring Tool : ComIL
- Web Browser : Any web browser
- Web Editor: Any web editor
- Video Editor : Video Capture Card Software or equivalent
- Audio Editor: Any audio editor
- Graphic Editor: Any graphic editor

Note: All proprietary software must be licensed

Teacher's Qualifications

- Diploma/Degree/Post Graduate Degree in Computer Science/Information Technology, or equivalent.

Students' Basic Requirement

- Students must have basic computer skills

SUGGESTED READINGS

Reading Materials

1. Shelly G.B, Cashman T.J, Vermaat M.E, Walker T.J. (2005) *Discovering Computers 2006 : A Gateway to Information*, Course Technology.
2. Bryan Pfaffenberger, Bill Daley (2003) *Computers In Your Future*, Prentice Hall.
3. Chua Chooi See (2000) *Visual Basic 6 : A Step-by-Step Guide*, Times Publication.
4. Capron H.L, J.A. Johnson (2005) *Computers: Tools For an Information Age Eighth Edition*, Prentice Hall.
5. George Beekman (2004) *Computer Confluence : Exploring Tomorrow's Technology*, Prentice Hall.
6. Stephen McGloughlin (2001) *Multimedia : Concepts and Practice*, Prentice Hall.

LEARNING OUTCOMES AND SPECIFICATIONS

1.0 INFORMATION AND COMMUNICATION TECHNOLOGY AND SOCIETY		(6 WEEKS)
TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
1.1 Introduction to Information and Communication Technology (4 periods)	<p>1.1.1 Overview of Information and Communication Technology (ICT)</p> <p>1.1.1.1 Define ICT.</p> <p>1.1.1.2 Describe the brief evolution of computers.</p> <p>1.1.2 ICT In Everyday Life: Education, Banking, Industry and Commerce</p> <p>1.1.2.1 List the usage of ICT in everyday life.</p> <p>1.1.2.2 State the differences between computerised and non-computerised systems.</p> <p>1.1.2.3 State the impact of ICT on society.</p>	<p>Individual/Group task</p> <ul style="list-style-type: none"> List the differences between computerised and non-computerised systems using search engines. Discuss and list the differences between computerised and non-computerised systems. Conduct a simple survey of ICT usage in the community. Discuss the effects of controversial contents on society.
1.2 Computer Ethics and Legal Issues (6 periods)	<p>1.2.1 Definition</p> <p>1.2.1.1 Define Computer Ethics, Code of Ethics, Intellectual Property, Privacy, Computer Crime and Cyber Law.</p> <p>1.2.1.2 Differentiate between ethics and law.</p> <p>1.2.1.3 State the need for intellectual property laws.</p>	

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
	<p>1.2.2 Privacy</p> <p>1.2.2.1 List ways to protect privacy.</p> <p>1.2.2.2 State authentication and verification methods/ technologies.</p> <p>1.2.3 Controversial Contents and Control</p> <p>1.2.3.1 List effects of controversial contents on society:</p> <ul style="list-style-type: none"> • Pornography • Slander <p>Describe the process of filtering to control access to controversial contents.</p> <p>1.2.3.2</p> <p>1.2.4 Computer Crimes</p> <p>1.2.4.1 Explain the need for Cyber Law.</p> <p>1.2.4.2 Explain briefly the computer crimes below:</p> <ul style="list-style-type: none"> • Fraud • Copyright Infringement • Theft • Attacks 	<ul style="list-style-type: none"> • Study on: <ul style="list-style-type: none"> - available technologies for authentication and verification (include: what it is, where it is used, its efficiency, its availability) - common ethical practices (10 Commandments of Computer Ethics) - computer criminals (examples: Kevin Mitnick and Aman Shah) <p>Group Task</p> <ul style="list-style-type: none"> • Brainstorming • Slide presentation in groups for each topic

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
1.3 Computer Security (6 periods)	<p>1.3.1 Definition</p> <p>1.3.1.1 Define computer security.</p> <p>1.3.2 Security Threats</p> <p>1.3.2.1 Explain briefly the different threats to computer security:</p> <ul style="list-style-type: none"> • Malicious code • Hacking • Natural disaster • Theft <p>1.3.3 Security Measures</p> <p>1.3.3.1 Select the appropriate security measures to overcome the identified computer threats</p> <p>1.3.3.2 Apply the correct security procedures.</p> <ul style="list-style-type: none"> • Antivirus • Anti-Spyware • Cryptography • Firewall • Data backup • Human aspects 	<p>Individual/Group task</p> <ul style="list-style-type: none"> • Conduct a study on effects of computer security breaches on an organization • Compile the study in a portfolio <p>Activity 1.3.3 (Refer to provided module).</p> <ul style="list-style-type: none"> • Visit any computer shop or organization that uses any of the security measures.

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
1.4 Current and Future Developments (8 periods)	1.4.1 Impact of ICT on Society 1.4.1.1 Locate information from various sources (example: Internet, library or magazines). 1.4.1.2 Describe the impact of ICT on society. 1.4.1.3 Present results in a clear, concise manner. 1.4.1.4 Display cooperation in conducting study.	<p>Group task Portfolio: A compilation of information on any of the issues below:</p> <ul style="list-style-type: none"> • Copyright and Piracy from moral and legal standpoints. • Lack of security and its effects on industry/economy/ government. • Malaysian Cyber law, electronic government law. <p>Individual/Group task Slide Presentation on any of the topics below:</p> <ul style="list-style-type: none"> • Phishing • Virus <ul style="list-style-type: none"> - Trojan Horse - Salami Attack • Hacking • Security measures <ul style="list-style-type: none"> - Biometrics(Fingerprint, Iris Scan) - Authentication

2.0 COMPUTER SYSTEMS		(10 WEEKS)
TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
2.1 System Concept (6 periods)	<p>2.1.1 Overview of Computer Systems</p> <p>2.1.1.1 Define computer systems.</p> <p>2.1.1.2 State the meaning of input, process, output and storage.</p> <p>2.1.1.3 Describe the information processing cycle which includes input, process, output and storage.</p> <p>2.1.2 Data Representation</p> <p>2.1.2.1 State the relationship of data representation: bit, byte and character.</p> <p>2.1.3 Introduction to Binary Coding</p> <p>2.1.3.1 Explain the function of ASCII code.</p> <p>2.1.4 Data Measurement</p> <p>2.1.4.1 State the units of data measurement:</p> <ul style="list-style-type: none"> • Bit • Byte • Kilobyte (KB) • Megabyte (MB) • Gigabyte (GB) • Terabyte (TB) <p>2.1.5 Clock Speed Measurement</p> <p>2.1.5.1 State the units of clock speed measurement:</p> <ul style="list-style-type: none"> • Megahertz (MHz) • Gigahertz (GHz) 	<p>Individual task Complete a task sheet (a block diagram) on 'The Computer System'.</p> <p>Identify the units used in data and clock speed measurements.</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
2.2 Hardware (12 periods)	<p>2.2.1 Input Devices 2.2.1.1 Identify the input devices used for text, graphic, audio and video.</p> <p>2.2.2 Output Devices 2.2.2.1 Identify the output devices used for text, graphic, audio and video</p> <p>2.2.3 Motherboard 2.2.3.1 Identify the location of the central processing unit (CPU), expansion slots, expansion cards, RAM slots, ports and connectors on the motherboard.</p> <p>2.2.4 Storage 2.2.4.1 Explain types and functions of : <ul style="list-style-type: none"> • primary storage (RAM, ROM) • secondary storage (magnetic medium optical medium, flash memory) </p>	<p>Retrieve photos of input and output devices from the Internet or other resources.</p> <p>Hands-on. 1. Teacher shows different parts and components of the motherboard. 2. Students identify the parts and components of the motherboard</p> <p>Individual task Differentiate between primary and secondary storage by completing a task sheet.</p>
2.3 Software (6 periods)	<p>2.3.1 Operating System (OS) 2.3.1.1 State the various types of OS used on different platforms. 2.3.1.2 State the functions of OS. 2.3.1.3 State the different interfaces of OS.</p> <p>2.3.2 Application Software 2.3.2.1 State the types of application software (word processing, spreadsheet, presentation, graphic). 2.3.2.2 Describe the uses of application software (word processing, spreadsheet, presentation, graphic).</p>	<p>Collect information on different OS from relevant materials or the Internet. Collect information on different application software from relevant materials or the Internet.</p> <p>Collect information on different application software from relevant materials or the Internet.</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
	<p>2.3.3 Utility Program 2.3.3.1 Differentiate between the types and usage of utility programmes (file management, diagnostic and file compression).</p> <p>2.3.4 Proprietary and Open Source Software 2.3.4.1 Differentiate between proprietary and open source software.</p>	<p>1. Find information on different types of proprietary and open source OS and application software. 2. Find, download and explore one open source application software and give your comment.</p>
2.4 Installation (12 periods)	<p>2.4.1 Personal Computer (PC) Assembling 2.4.1.1 Assemble the components of a PC. 2.4.1.2 Display cooperation in assembling the components of a PC.</p> <p>2.4.2 Hard Disk Partitioning and Formatting 2.4.2.1 Format and partition the hard disk.</p> <p>2.4.3 Software Installation 2.4.3.1 Install operating system, application software and utility programs.</p>	<p>Group task (Refer to provided module)</p> <ul style="list-style-type: none"> • Assemble components. • Follow step-by-step installation instructions provided. • Test the functionality of the PC.
2.5 Current and Future Developments (4 periods)	<p>2.5.1 Latest Open Source Software Available 2.5.1.1 Explain the latest open source OS and application software available in the market.</p> <p>2.5.2 Latest Development In ICT 2.5.2.1 Explain the latest ICT hardware and software 2.5.2.2 Explain pervasive computing.</p>	<p>Collect related information on open source software and compile it into a portfolio/digital portfolio.</p>

3.0 COMPUTER NETWORKS AND COMMUNICATIONS		(8 WEEKS)
TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
3.1 Basic Concepts of Computer Networks and Communications (6 periods)	<p>3.1.1 Definition</p> <p>3.1.1.1 Define computer networks.</p> <p>3.1.1.2 Define communications.</p> <p>3.1.2 Importance of Computer Network</p> <p>3.1.2.1 State the importance of computer networks and communications.</p> <p>3.1.3 Types of Networks</p> <p>3.1.3.1 Define types of computer networks:</p> <ul style="list-style-type: none"> • Local Area Network (LAN) • Metropolitan Area Network (MAN) • Wide Area Network (WAN) <p>3.1.3.2 Differentiate between the three types of computer networks.</p> <p>3.1.4 Network Architecture</p> <p>3.1.4.1 Define two types of network architecture:</p> <ul style="list-style-type: none"> • Client/Server • Peer-to-Peer <p>3.1.5 Network Topology</p> <p>3.1.5.1 State three types of network topologies:</p> <ul style="list-style-type: none"> • bus • ring • star 	<p>Group task Cite examples in immediate environment to show the importance of network and communication.</p> <p>Group task Retrieve information on types of network architectures from relevant materials and the Internet</p> <p>Individual task Prepare a graphic representation of the different types of network topology</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
	<p>3.1.5.2 Differentiate between the three types of network topology.</p> <p>3.1.6 Protocol</p> <p>3.1.6.1 Define Transmission Control Protocol/Internet Protocol (TCP/IP) as a protocol to facilitate communication over computer network.</p> <p>3.1.7 Internet, Intranet, Extranet</p> <p>3.1.7.1 Describe the types of network communications technology:</p> <ul style="list-style-type: none"> • Internet • Intranet • Extranet 	<p>Group Task Retrieve information from relevant materials and the Internet.</p> <p>Visit Internet Provider such as TMnet and Mimos.</p>
<p>3.2 Hardware Requirements (8 periods)</p>	<p>3.2.1 Devices</p> <p>3.2.1.1 Identify the devices needed in computer network communication :</p> <ul style="list-style-type: none"> • Network Interface Card (NIC) • Wireless Network Interface Card • Modem (internal and external) • Hub / Switch • Router • Wireless Access Point <p>3.2.1.2 State the functions of the following:</p> <ul style="list-style-type: none"> • Network Interface Card (NIC) • Wireless Network Interface Card • Modem (internal and external) • Hub / Switch • Router • Wireless Access Point 	<p>Individual task List the various network devices required to set up client/server network.</p> <p>Individual task Retrieve information on the function of the stated devices from relevant materials and the Internet.</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
	<p>3.2.2 Medium</p> <p>3.2.2.1 Identify various types of cables such as Unshielded Twisted Pair (UTP), Shielded Twisted Pair (STP), Coaxial and Fibre Optic Cable.</p> <p>3.2.2.2 Identify various types of wireless transmission media such as infrared, radio wave and satellite.</p>	<p>Individual task</p> <p>Label correctly pictures of different transmission media.</p>
<p>3.3 Software Requirements (4 periods)</p>	<p>3.3.1 Server Software</p> <p>3.3.1.1 Define Network Operating System.</p> <p>3.3.1.2 Name various Network Operating System Software.</p> <p>3.3.2 Client Software</p> <p>3.3.2.1 State the functions of various client software.</p>	<p>Individual task</p> <p>Retrieve information from books and the Internet.</p> <p>Group task</p> <p>State the functions of the following:</p> <ul style="list-style-type: none"> • web browser (Internet Explorer, Firefox) • email client (Outlook Express, Thunderbird) • network utilities (Ping, Trace Route) • network file manager (Network Neighbourhood, My Network Places)

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
3.4 Setting Network Facilities (12 periods)	3.4.1 Installation of Network Interface Cards (NIC) 3.4.1.1 Insert network interface cards (NIC). 3.4.1.2 Install drivers for the NIC. 3.4.2 Cable Crimping and Testing 3.4.2.1 Crimp and test UTP cable <ul style="list-style-type: none"> • Straight cable • Crossed cable 3.4.2.2 Create awareness of the correct way when crimping a cable. 3.4.3 Configuration and Testing of Network 3.4.3.1 Configure the workstation to join a Local Area Network : <ul style="list-style-type: none"> • Internet Protocol (IP) Address • Subnet Mask • Server name 3.4.3.2 Test the network connection.	Group task (Refer to provided module). 1. Insert NIC correctly. 2. Follow step-by-step installation instructions provided. Individual/ Group task Ping the server from the configured workstation.
	3.4.4 Share Data 3.4.4.1 Create a shared folder.	Individual/ Group task <ul style="list-style-type: none"> • Set up a shared folder. • Save a file in the shared folder. • Access the file in the shared folder from other workstations.

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
3.5 Current and Future Developments (6 periods)	3.5.1 Latest Development In Networks and Communications 3.5.1.1 Describe <ul style="list-style-type: none"> • Mobile Computing (specifications, services, frequencies) • Internet Technology and Services (VOIP, BLOG) • Types of network (examples: PAN, VPN, WLAN, WIMAX) 	Individual task <ul style="list-style-type: none"> • Study on any of the chosen topic and save the document in the shared folder. • Write a short report (minimum of 350 words) and save the document in the shared folder.

4.0 MULTIMEDIA		(9 WEEKS)
TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
4.1 Multimedia Concepts (6 periods)	4.1.1 Definition of Multimedia 4.1.1.1 Define multimedia.	Individual task Collect and discuss information about the concept of multimedia .
	4.1.2 Multimedia in Various Fields 4.1.2.1 Identify the use of multimedia in various fields.	Individual task Give examples of various applications of multimedia and discuss their contributions to the society.
	4.1.3 Interactivity of Multimedia 4.1.3.1 Differentiate between the characteristics of linear and non-linear multimedia.	Individual task Discuss the characteristics of linear and non-linear multimedia.
	4.1.4 Medium of Delivery 4.1.4.1 Compare and contrast the mediums of delivery for multimedia applications: <ul style="list-style-type: none"> • web-based • CD-based 	Individual task Discuss the similarities and differences between mediums of multimedia application delivery.
	4.1.5 Multimedia Elements 4.1.5.1 Identify the multimedia elements: <ul style="list-style-type: none"> • text • audio • video • graphics • animation 	Individual task Match multimedia elements with the respective standard file formats.

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
<p>4.2 Hardware and Software (6 periods)</p>	<p>4.2.1 Hardware</p> <p>4.2.1.1 Identify hardware that can be used to produce multimedia products:</p> <ul style="list-style-type: none"> • scanner • video camera • camera • audio devices • video capture devices <p>4.2.2 Editing Software</p> <p>4.2.2.1 Identify editing software that can be used to produce multimedia elements:</p> <ul style="list-style-type: none"> • text editor • graphics and image editor • audio editor • video and animation editor <p>4.2.3 Authoring Tools</p> <p>4.2.3.1 Define the various concepts in authoring tools:</p> <ul style="list-style-type: none"> • time frame concept • icon concept • card concept 	<p>Group task</p> <p>Scan pictures using scanner.</p> <p>Group task</p> <p>Capture images and motions using camera and video camera.</p> <p>Group task</p> <p>Capture sound, music, narration or special effects using audio devices.</p> <p>Group task</p> <p>Capture video from video tape, laser disc or camera using video capture devices.</p> <p>Individual task</p> <p>Collect information on popular multimedia editing software from printed materials or the Internet.</p> <p>Individual task</p> <p>Produce a portfolio on various concepts used by the specific authoring tools.</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
<p>4.3 Multimedia Development (24 periods)</p>	<p>4.2.4 Web Editor 4.2.4.1 Describe and give examples of web editors:</p> <ul style="list-style-type: none"> • text-based • WYSIWYG <p>4.3.1 User Interface Principles 4.3.1.1 State user interface principles. 4.3.1.2 Apply suitable user interface principles in a project.</p> <p>4.3.2 Development Team 4.3.2.1 State the role of each member in a development team (examples: project manager, subject matter expert, instructional designer, graphics artist, audio-video technician and programmer).</p> <p>4.3.3 Multimedia Production 4.3.3.1 Describe the phases in multimedia production:</p> <ul style="list-style-type: none"> • analysis • design • implementation • testing • evaluation • publishing <p>4.3.3.2 Apply all the phases of multimedia production to produce an interactive educational multimedia project.</p>	<p>Individual task Collect information on web editors from printed materials or the Internet.</p> <p>Individual task Collect information on user interface principles from the Internet.</p> <p>Group task Form a development team, consisting of a project manager and assign members with respective responsibilities based on the module.</p> <p>Individual task Collect information on multimedia production phases from printed materials or the Internet.</p> <p>Group task Produce an interactive educational multimedia project based on the module.</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
4.4 Current and Future Developments (4 periods)	4.4.1 Immersive Multimedia 4.4.1.1 Give an example of immersive multimedia in education, business or entertainment.	Group task Produce a portfolio about the example of immersive multimedia in education, business or entertainment.

5.0 PROGRAMMING		(10 WEEKS)
TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
5.1 Basic Programming Concepts (10 periods)	5.1.1 Define Program and Programming Language 5.1.1.1 State the definition of program. 5.1.1.2 State the definition of programming language.	Individual task Collect information on definition of the program and the programming language from printed materials or the Internet.
	5.1.2 Levels and Generations Of Programming Languages 5.1.2.1 Identify the generations of low-level programming languages with examples. 5.1.2.2 Identify the generations of high-level programming languages with examples.	Individual task Draw a hierarchy chart to classify the generations of each level of programming language.
	5.1.3 Programming Language Approaches 5.1.3.1 Define structured approach in programming. 5.1.3.2 Define object-oriented approach in programming. 5.1.3.3 Differentiate between structured approach and object-oriented approach in programming.	Individual task Collect information on different programming language approaches from printed materials or the Internet. Individual task Produce a compare and contrast table on structured approach and object-oriented approach in programming.
	5.1.4 Translator 5.1.4.1 Describe the translation method of programming using assembler, interpreter and compiler.	Individual task Write an essay on how the assembler, interpreter and compiler work.

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
	<p>5.1.5 Basic Elements In Programming</p> <p>5.1.5.1 Differentiate between constants and variables.</p> <p>5.1.5.2 Differentiate between the data types: Boolean, integer, double, string and date.</p> <p>5.1.5.3 Differentiate between mathematical and logical (Boolean) operators.</p> <p>5.1.5.4 Differentiate between sequence control structure and selection control structure.</p>	<p>Individual task</p> <p>Draw a chart or table to illustrate the understanding on constants and variables.</p> <p>Individual task</p> <p>Draw a chart or table to illustrate the understanding on different data types.</p> <p>Individual task</p> <p>Draw a chart or table to illustrate the understanding on the mathematical and logical (Boolean) operators.</p> <p>Individual task</p> <p>Find out a simple flow chart for both structures from printed materials or the internet.</p>
<p>5.2 Program Development (24 periods)</p>	<p>5.2.1 Program Development Phases</p> <p>5.2.1.1 Describe the five main phases in program development:</p> <ul style="list-style-type: none"> • problem analysis • program design • coding • testing and debugging • documentation 	<p>Individual task</p> <p>Collect information on program development phases from printed materials or the Internet.</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
	5.2.2 Develop a program 5.2.2.1 Apply program development phases to solve problems.	Individual task Develop a simple program using Visual Basic based on the module.
5.3 Current and Future Developments (6 periods)	5.3.1 Latest Programming Languages 5.3.1.1 Find out the latest programming languages: <ul style="list-style-type: none"> • fifth generation language • natural language • OpenGL (Graphic Library) 	Group Task Collect information on the latest programming languages from printed materials or the Internet.

6.0 INFORMATION SYSTEMS		(10 WEEKS)
TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
6.1 Concepts of Information Systems (6 periods)	<p>6.1.1 Definition</p> <p>6.1.1.1 Give the meaning of data, information and information systems.</p>	<p>Individual task</p> <p>Draw a mind map on data, information and information systems.</p>
	<p>6.1.2 Usage of Information Systems In Various Fields</p> <p>6.1.2.1 State the usage of Information Systems in education, business and management.</p>	<p>Individual task</p> <p>Collect information on usage of Information Systems in education, business and management from printed materials or the Internet.</p>
	<p>6.1.3 Information System Components</p> <p>6.1.3.1 List the Information System components:</p> <ul style="list-style-type: none"> • data • hardware • software • people • procedure <p>6.1.3.2 Define each of the Information System components.</p> <p>6.1.3.3 Describe the interrelation between information system components using a diagram.</p>	<p>Individual task</p> <p>Draw a mind map on the five main IS components based on a given scenario.</p> <p>Individual task</p> <p>Discuss how data, hardware, software, people and procedure are interrelated in information system environments.</p> <p>Individual task</p> <p>Draw a diagram showing the interrelation between information system components.</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
	<p>6.1.4 Types of Information Systems</p> <p>6.1.4.1 List five types of Information Systems:</p> <ul style="list-style-type: none"> • Management Information System (MIS) • Transaction Processing System (TPS) • Decision Support System (DSS) • Executive Information System (EIS) • Expert System (ES)/Artificial Intelligence (AI) <p>6.1.4.2 State the usage of each type of information system.</p> <p>6.1.5 Hierarchy of Data</p> <p>6.1.5.1 Define bit, byte, field, record, and file</p> <p>6.1.5.2 State the hierarchy of data:</p> <ul style="list-style-type: none"> • Bit → Byte (Character) → Field → Record → File → Database 	<p>Individual task</p> <p>Collect information on the five types of IS from printed materials or the Internet.</p> <p>Individual task</p> <p>List and provide examples of the types of information systems.</p> <p>Individual task</p> <p>Collect information on bit, byte, field, record, file and database from printed materials or the Internet.</p> <p>Individual task</p> <p>Draw a diagram to illustrate the hierarchy of data.</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
<p>6.2 Software (8 periods)</p>	<p>6.2.1 Definition</p> <p>6.2.1.1 Define database and Database Management Systems (DBMS).</p> <p>6.2.1.2 List the benefits of using database.</p> <p>6.2.2 Features</p> <p>6.2.2.1 State the relationship between attribute (field), row (record) and relation (file).</p> <p>6.2.2.2 Define the primary key and foreign key.</p> <p>6.2.2.3 State the importance of the primary key.</p> <p>6.2.2.4 Differentiate between the primary key and foreign key.</p> <p>6.2.2.5 State the importance of relationship between the primary key and foreign key.</p> <p>6.2.3 Database Objects</p> <p>6.2.3.1 Define the following database objects/ tools: Table, form, query, report.</p>	<p>Individual task</p> <p>Produce a comparison table on database and DBMS.</p> <p>Group task</p> <p>Brainstorm and record the findings in a report.</p> <p>Individual task</p> <p>Show the relationship between attribute, row and relation on a chart or table.</p> <p>Individual task</p> <p>Collect information on primary key and foreign key from printed materials or the Internet.</p> <p>Individual task</p> <p>Draw a simple diagram to show the relationship.</p> <p>Individual task</p> <p>Collect information on four database objects/ tools from printed materials or the Internet.</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
	<p>6.2.3.2 Identify table, query, form and report as database objects/ tools.</p> <p>6.2.4 Data Manipulation</p> <p>6.2.4.1 List the basic operations of data manipulation:</p> <ul style="list-style-type: none"> • Update • Insert • Delete • Retrieve • Sort • Filter • Search <p>6.2.4.2 State the usage of basic operations in data manipulation.</p>	<p>Individual task</p> <p>Identify the four database objects/ tools in Microsoft Access.</p> <p>Individual task</p> <p>Collect information on the basic operations of data manipulation from printed materials or the Internet.</p> <p>Individual task</p> <p>Collect information on the usage of basic operations in data manipulation from printed materials or the Internet.</p>
<p>6.3 Database Development (22 periods)</p>	<p>6.3.1 Phases of Systems Development</p> <p>6.3.1.1 Describe the phases of systems development:</p> <ul style="list-style-type: none"> • Analysis • Design • Implementation • Testing • Documentation • Maintenance 	<p>Individual task</p> <p>Collect information on the phases of systems development from printed materials or the Internet.</p>

TOPICS	LEARNING OUTCOMES	SUGGESTED ACTIVITIES
	<p>6.3.2 Develop A Database Project</p> <p>6.3.2.1 Identify a project.</p> <p>6.3.2.2 Identify the project requirements.</p> <p>6.3.2.3 Classify project requirements into two tables.</p> <p>6.3.2.4 Design database tables.</p> <p>6.3.2.5 Create a database.</p> <p>6.3.2.6 Create two tables that include the primary key in each table.</p> <p>6.3.2.7 Build a relationship between two tables.</p> <p>6.3.2.8 Enter data into the table.</p> <p>6.3.2.9 Create a form that relates to the table content.</p> <p>6.3.2.10 Create a query to retrieve required information with one or more conditions.</p> <p>6.3.2.11 Generate a report.</p> <p>6.3.2.12 Gather all the documents from the above phases into a folio.</p>	<p>Individual task</p> <p>Create a database that has tables, relationships, forms, queries and reports based on the module.</p>
<p>6.4 Current and Future Developments (4 periods)</p>	<p>6.4.1 Web-based Application</p> <p>6.4.1.1 Find out current developments in computer information systems.</p>	<p>Group task</p> <p>Produce a portfolio about current developments in computer information systems.</p>