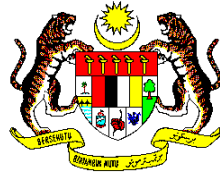


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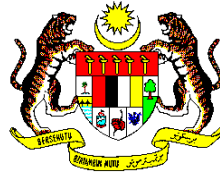


KEMENTERIAN PELAJARAN MALAYSIA

**SUKATAN PELAJARAN
KURIKULUM BERSEPADU
SEKOLAH MENENGAH**

**INFORMATION AND
COMMUNICATION
TECHNOLOGY**

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Pusat Perkembangan Kurikulum
Kementerian Pelajaran Malaysia
2006

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Perpustakaan Negara Malaysia Data Pengkatalogan-dalam- Penerbitan

Malaysia. Pusat Perkembangan Kurikulum
Sukatan Pelajaran Information and Communication Technology KBSM
=Curriculum
Pusat Perkembangan Kurikulum, Kementerian Pelajaran Malaysia
ISBN 983-2717-81-7



KETUA PENGARAH PELAJARAN MALAYSIA
Director-General of Education Malaysia

KATA PENGHANTAR

Kurikulum mata pelajaran Teknologi Maklumat (TM) telah dilaksanakan sejak tahun 1999. Lantaran kepesatan pembangunan dan kemajuan dalam bidang teknologi maklumat maka kandungan kurikulum mata pelajaran ini telah disemak semula dan dikemaskini untuk disesuaikan dengan kepesatan perubahan tersebut. Pada masa yang sama, mata pelajaran TM ini telah dikategorikan sebagai mata pelajaran Sains dan Teknologi maka bermula pada tahun 2006 mata pelajaran ini akan diajar dalam bahasa Inggeris.

Selari dengan perkembangan di atas, nama mata pelajaran ini telah diubah daripada Teknologi Maklumat (*Information Technology*) kepada *Information and Communication Technology* (ICT). Dalam kurikulum yang disemak semula ini, di samping penyampaian bidang pengetahuan dalam ICT, penekanan kepada bidang kemahiran ICT dipertingkatkan. Penekanan ini bertujuan untuk memantapkan pelaksanaan kurikulum ICT di sekolah-sekolah menengah bagi meningkatkan minat, ilmu pengetahuan dan kemahiran pelajar untuk melanjutkan pelajaran dalam bidang ICT atau menceburi kerjaya yang berkaitan dengannya.

Usaha penyemakan semula Sukatan Pelajaran ICT ini telah melibatkan banyak pihak termasuk, pihak universiti-universiti tempatan, maktab-maktab perguruan dan wakil-wakil dari sektor swasta. Pada kesempatan ini, saya merakamkan ucapan setinggi-tinggi penghargaan dan terima kasih kepada semua pihak yang telah memberikan sumbangan kepakaran, masa dan fikiran untuk membina Sukatan Pelajaran ICT ini.

Akhir kata, semoga kandungan sukatan pelajaran ini memenuhi kehendak tuntutan perkembangan ICT semasa dan membantu guru dalam perancangan dan persediaan pengajaran dan pembelajaran ICT di sekolah.

SELAMAT MAJU JAYA

(DATO' Dr. HAJI AHAMAD BIN SIPON)
Ketua Pengarah Pelajaran Malaysia

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.

INTRODUCTION

The Malaysian school curriculum is based on the National Education Philosophy. Underpinning this philosophy is the holistic development of the individual as an intellectual, emotional, physical and spiritual being. The introduction of Information and Communication Technology (ICT) as an elective subject for the Upper Secondary Level in the *Kurikulum Bersepadu Sekolah Menengah* (KBSM) is a move towards producing a technologically capable work force that is able to participate fully in the global economy of the 21st century. Thus, this curriculum offers learners with basic ICT skills the opportunity to further develop their interest in specific areas offered in the syllabus.

Information and Communication Technology is an area of study, which involves various fields specifically communications and computer systems. ICT is the technology required for information processing, in particular, the use of electronic computers, communication devices and software applications to convert, store, protect, process, transmit, and retrieve information from anywhere, anytime. Therefore, the curriculum focuses on both software applications and hardware knowledge in managing diverse forms of information. Given the dynamic nature of the field of study, the scope of this subject will keep in pace with rapidly changing developments and innovations in ICT.

AIM

The aims of the Information and Communication Technology curriculum at the school level are to provide students with knowledge and skills in ICT to enable them to solve problems and make informed decisions in everyday life based on positive attitudes and noble values, and to develop concerned, dynamic and progressive individuals with an ICT culture that values knowledge and ethics towards the technological advancement of the nation.

OBJECTIVES

Learners should be able to:

- acquire knowledge about ICT principles, processes and related fields
- examine and understand ICT principles, processes and related fields
- communicate and manage information effectively through ICT
- apply ICT knowledge and skills in the learning area to be taught
- generate ideas and produce problem-solving output by using either multimedia, programming or database application to meet identified needs
- show awareness of the technology usage and impact on the individual and society through ethical practices
- appreciate the role and significance of ICT and its impact on society and economy

CONTENT ORGANISATION

The curriculum emphasises the integration of **Knowledge, Skills** and **Values**.

Knowledge

The Knowledge aspect in the ICT curriculum comprises the following:

- concepts, facts and terminologies of ICT
- procedures in managing computer systems
- sequential processes in developing products
- programming commands and syntax
- current and future issues related to IC

Skills

The skills in the ICT curriculum are:

a. Communication Skills

This involves:

- information sharing and dissemination
- production through various means including graphic presentation, sketching and proto-typing using Information and Communication Technology
- identifying, elaborating and interpreting various points of view
- exploiting, accessing and processing information with confidence and competence

- ensuring security of information dissemination

b. Information Management Skills

The curriculum provides opportunities to develop information management skills through:

- maintaining the integration of the 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

c. Managing Computer Systems

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

d. Problem-solving Skills

Problem-solving skills encompass 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
- testing ideas and solutions, and making decisions based on experience and sound rationale
- process and product evaluation

Values

Inherent within any successful use of ICT is the ability to handle information systems with diligence, accuracy, precision and confidence. Furthermore, the codes of ethics of communication in ICT will instil qualities like responsibility, respect, cooperation and accountability.

TEACHING-LEARNING APPROACHES

The ICT curriculum comprises six learning areas which need not be implemented in the order as organised in the syllabus. Thus, the teaching-learning process may begin with **any** learning area provided learners have mastered the basic skills of ICT. Teachers are encouraged to apply self-directed, self-accessed, self-assessed and self-paced (SeDAAP) approaches whilst acting as facilitators in teaching the six learning areas. In addition, the teacher has to play an important role in teaching the concepts and skills of each learning area.

The ICT curriculum is process-based. As the teaching and learning strategies are *hands-on* and *minds-on*, much of the teaching-learning processes are practical in nature.

The two principles used are “learn *with* ICT” and “learn *about* ICT”.

- a. The “learn *with* ICT” enables learners to apply acquired basic ICT knowledge and skills to become effective users.
- b. The “learn *about* ICT” equips learners with ICT knowledge and skills that contribute to technological advancements.

SYLLABUS CONTENT

The ICT syllabus is organized into six (6) learning areas namely:

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

Each learning area consists of **TOPICS** and **SCOPE**. **TOPICS** is a list of selected area to be taught under **LEARNING AREA** while the **SCOPE** shows the extent of coverage required in the teaching of the topics.

1.0 INFORMATION AND COMMUNICATION TECHNOLOGY AND SOCIETY

TOPICS	SCOPE
1.1 Introduction to Information and Communication Technology	<ul style="list-style-type: none"> • Overview of Information and Communication Technology (ICT) • ICT in everyday life
1.2 Computer Ethics and Legal Issues	<ul style="list-style-type: none"> • Definition: <ul style="list-style-type: none"> ○ Computer Ethics ○ Code of Ethics ○ Intellectual Property • Privacy: <ul style="list-style-type: none"> ○ Authorised access: user authentication and verification • Controversial Contents and Control: <ul style="list-style-type: none"> Content examples: <ul style="list-style-type: none"> ○ Pornography ○ Slander Control example: <ul style="list-style-type: none"> ○ Filtering • Computer Crimes: <ul style="list-style-type: none"> ○ Definition: Computer crime and Cyber law Examples of computer crimes: <ul style="list-style-type: none"> ○ Fraud ○ Copyright Infringement ○ Theft ○ Attacks
1.3 Computer Security	<ul style="list-style-type: none"> • Definition : Computer Security • Security threats: <ul style="list-style-type: none"> Examples of security threats: <ul style="list-style-type: none"> ○ Malicious codes ○ Hacking ○ Natural/environment ○ Theft • Security Measures: <ul style="list-style-type: none"> ○ Data backup ○ Cryptography: encryption and decryption ○ Antivirus ○ Anti-spyware ○ Firewall ○ Human aspects : awareness
1.4 Current and Future Developments	<ul style="list-style-type: none"> • Impact of ICT on society

2.0 COMPUTER SYSTEM

TOPICS	SCOPE
2.1 System Concept	<ul style="list-style-type: none"> • Overview of computer system • Data Representation • Introduction to Binary coding: ASCII • Data measurement • Clock speed measurement
2.2 Hardware	<ul style="list-style-type: none"> • Input devices • Output devices • Motherboard: <ul style="list-style-type: none"> ○ Central processing unit (CPU) ○ Expansion slots ○ Expansion cards ○ RAM slot ○ Ports and Connectors • Storage: <ul style="list-style-type: none"> ○ Primary storage (RAM/ROM) ○ Secondary storage (magnetic medium, optical medium, flash memory)
2.3 Software	<ul style="list-style-type: none"> • Operating System: <ul style="list-style-type: none"> ○ Platforms ○ Functions ○ Interfaces • Application Software:- types and usage: <ul style="list-style-type: none"> ○ Word processing ○ Spreadsheet ○ Presentation ○ Graphics • Utility Program:- types and usage <ul style="list-style-type: none"> ○ File management ○ Diagnostic ○ File compression • Proprietary and open source software
2.4 Installation	<ul style="list-style-type: none"> • PC assembling • Hard disk partitioning and formatting • Software installation: <ul style="list-style-type: none"> ○ Operating system ○ Application software ○ Utility program
2.5 Current and Future Developments	<ul style="list-style-type: none"> • Latest open source software available • Latest Hardware and Software Development In ICT

3.0 COMPUTER NETWORKS AND COMMUNICATIONS

TOPICS	SCOPE
3.1 Basic Concepts of Networks and communications	<ul style="list-style-type: none">• Definition:<ul style="list-style-type: none">○ Networks○ Communications• Importance of Networks• Types of Networks:<ul style="list-style-type: none">○ LAN○ MAN○ WAN• Network Architecture:<ul style="list-style-type: none">○ Client/Server○ Peer-to-Peer• Network Topology:<ul style="list-style-type: none">○ Bus○ Star○ Ring• Protocol• Internet, intranet, extranet
3.2 Hardware Requirements	<ul style="list-style-type: none">• Network Interface Card (NIC) and Wireless Network Interface Card• Internal and External Modem, Hub, Switch, Router and Wireless Access Point• Medium:<ul style="list-style-type: none">○ Cables: Unshielded Twisted Pair, Shielded Twisted Pair, Coaxial, and Fibre Optic○ Wireless: infrared, radio wave, and satellite
3.3 Software Requirements	<ul style="list-style-type: none">• Server Software (Network Operating System)• Client Software
3.4 Setting Network Facilities	<ul style="list-style-type: none">• Installation of Network Interface Cards• Cable Crimping and Testing• Configuration and Testing of Network• Share Data (folder and files) and Resources

TOPICS	SCOPE
3.5 Current and Future Developments	<ul style="list-style-type: none">• Mobile Computing:<ul style="list-style-type: none">○ Specifications○ Services○ Frequencies• Internet Technology and Services:<ul style="list-style-type: none">○ VoIP○ BLOG• Types of Network:<ul style="list-style-type: none">○ PAN○ VPN○ WLAN○ WIMAX

4.0 MULTIMEDIA

TOPICS	SCOPE
4.1 Multimedia Concepts	<ul style="list-style-type: none">• Definition of Multimedia• Multimedia in various fields• Interactivity of multimedia :<ul style="list-style-type: none">○ Linear○ Nonlinear• Medium of delivery :<ul style="list-style-type: none">○ Web-based○ CD-based• Multimedia elements :<ul style="list-style-type: none">○ Text○ Audio○ Video○ Graphic○ Animation
4.2 Hardware and Software	<ul style="list-style-type: none">• Hardware :<ul style="list-style-type: none">○ Scanner○ Video camera○ Camera○ Audio devices○ Video capture devices• Editing software :<ul style="list-style-type: none">○ Text editor○ Graphic and Image editor○ Audio editor○ Video and Animation editor• Authoring tools :<ul style="list-style-type: none">○ Time frame concept○ Icon concept○ Card concept• Web editor :<ul style="list-style-type: none">○ Text-based WYSIWYG

TOPICS	SCOPE
4.3 Multimedia Development	<ul style="list-style-type: none">• User Interface Principles• Development team• Multimedia production that covers the following phases:<ul style="list-style-type: none">○ Analysis○ Design and Develop○ Implementation○ Testing○ Evaluation○ Publishing (Packaging/Uploading)
4.4 Current and Future Developments	<ul style="list-style-type: none">• Immersive multimedia

5.0 PROGRAMMING

TOPICS	SCOPE
5.1 Basic Programming Concepts	<ul style="list-style-type: none">• Definition<ul style="list-style-type: none">○ Program○ Programming Language• Levels and generations of programming languages:<ul style="list-style-type: none">○ Low-Level Languages○ High-Level Languages• Programming language approaches :<ul style="list-style-type: none">○ Structured○ Object-oriented• Translator<ul style="list-style-type: none">○ Assembler○ Interpreter○ Compiler• Basic Elements in Programming:<ul style="list-style-type: none">○ Constants and variables○ Data Types○ Operator○ Control Structures: Sequence and Selection
5.2 Program Development	<ul style="list-style-type: none">• Apply program development phases to develop a problem-solving program• Program development phases :<ul style="list-style-type: none">○ Problem analysis○ Program design○ Coding○ Testing and Debugging○ Documentation
5.3 Current and Future Developments	<ul style="list-style-type: none">• Fifth generation language• Natural language• OpenGL (Graphic Library)

6.0 INFORMATION SYSTEMS

TOPICS	SCOPE
6.1 Concepts of Information Systems	<ul style="list-style-type: none">• Definition:<ul style="list-style-type: none">○ Data○ Information○ Information systems• Usage of Information Systems in various fields• Information System Components:<ul style="list-style-type: none">○ Data○ Hardware○ Software○ People○ Procedure• Types of Information Systems• Hierarchy of data:<ul style="list-style-type: none">○ Bit → Byte(Character) → Field → Record → File → Database
6.2 Software	<ul style="list-style-type: none">• Definition:<ul style="list-style-type: none">○ Database○ Database Management Systems (DBMS)• Features:<ul style="list-style-type: none">○ Relation(File)○ Field (Attributes)○ Rows (Record)○ Primary Key○ Foreign Key○ Relationship• Database objects:<ul style="list-style-type: none">○ Table○ Query○ Form○ Report• Data Manipulation<ul style="list-style-type: none">○ Update○ Insert○ Delete○ Retrieve○ Sort○ Filter○ Search
6.3 Database Development	<ul style="list-style-type: none">• Phases of system development :<ul style="list-style-type: none">○ Analysis○ Design○ Implementation○ Testing○ Documentation○ Maintenance

TOPICS	SCOPE
	<ul style="list-style-type: none">• Develop a database project<ul style="list-style-type: none">○ Design database○ Create database○ Create tables○ Build Relationship○ Create Forms○ Build Query○ Generate Reports
6.4 Current and Future Developments	<ul style="list-style-type: none">• Web-based application