

Annex 11

The Requirements of Basic Academic Attainments for Senior Secondary Information Technology

I . Basic rationale

In the contemporary society where information technology is increasingly developing in depth, new technology as represented by mobile internet, cloud computing, big data, the internet of things, artificial intelligence and so on, has created lots of completely new lifestyle as well as new ways of working and learning such as e-commerce, flexible work, autonomous learning, smart household, etc., constantly updating the models of communication, cognition and innovation, bringing about unlimited opportunities and challenges to the development of human society.

Senior secondary students in the contemporary era should have information technology literacy for sustainable development; develop positive values and attitudes towards information technology; possess the capability of skillfully applying information technology to solve the problem in daily life, so as to lay the foundation for adapting to the future social life, entering into higher education or the job market, etc. Therefore, senior secondary Information Technology curriculum will be based on the core literacy of information technology, deepening the learning content of information technology, broadening the learning field, strengthening practical skills and reflective thinking ability, and promoting the raise of the level of literacy of senior secondary students in this area as well as improving its structure. On these grounds, the Requirements of Basic Academic Attainments for Senior Secondary Information Technology should comply with the following fundamental principles:

(1) Persisting in laying a solid foundation, taking into account the individualised development, enhancing the Information Technology literacy of every student.

The curriculum should be for all students, deepening their understanding of information technology, strengthening their basic skills of information technology application. Meanwhile, it should meet students' individualised development needs, and further enhance their information technology literacy.

(2) Valuing the understanding of scientific and technological thinking and methods; developing students' thinking ability and innovation awareness.

[Reference Only]

During the learning process of the information technology curriculum, importance should be attached to students' understanding of the basic information technology thinking and methods; promote the advanced development of computational thinking, creative thinking and critical thinking in information technology application; and cultivate students' creative consciousness and innovative spirit.

(3) Emphasising practicality; developing students' problem-solving ability.

In the face of the practical problems of life and learning, the curriculum strengthens students' practical ability to apply information technology to solve problems, to make good use of information technology to conduct digital learning and lifelong learning autonomously, and lay a solid foundation for senior secondary students' further studies and employment in the future.

(4) Paying attention to the development and influence of information technology; cultivating good citizens in the field of information.

Students should pay attention to the latest development of information technology, and be willing to integrate information technology into living. They should be aware of the impact of new information technology on society and individuals, and examine rationally the ethical challenges brought by information technology, abide by the relevant laws of information technology, apply information technology, in a regulated manner to improve the quality of life and learning.

II. Curriculum goals

(1) Develop students' understanding of the basic concept and principles of information technology; acquire the fundamental knowledge of information technology and information technology society.

(2) Nurture students' basic skills of using information technology in a skillful manner, be able to carry out basic information technology tasks independently or cooperatively.

(3) Guide students to accumulate basic experience in information technology application including the latest ones through diverse information technology practice combining hardware and software.

(4) Taking advantage of digital learning, lead students to lifelong learning; develop the habit of applying information technology healthily and carrying out autonomous and cooperative learning.

[Reference Only]

- (5) Cultivate students' ability of solving practical problems around them by applying information technology; develop their logical thinking, computational thinking and critical thinking; enhance the basic problem solving ability by using information technology.
- (6) Guide students to understand the basic scientific and technological thinking and methods contained in digitalisation, networking, intelligentisation, security, open source, optimisation of information technology, etc., so as to improve the taste of life and learning effectiveness.
- (7) Guide students to take an active part in the social practice of information technology, experience such scientific technology as computer-aided design and manufacturing (CAD and CAM), three dimensional printing under the conditions of informationisation and networking; experience and understand the culture of information society, learning, communication, entertainment, etc., form the basic attitude of applying information technology responsibly.
- (8) Guide students to pay attention to the latest development of information technology; examine its positive and negative impact on society, and form the basic concept of handling information technology in a rational manner.

III. The requirements of basic academic attainments in different learning domains

Explanation of coding:

- (1) The capital English letters represent the requirements of basic academic attainments in different learning domains; A – Concept and cognition, B – Application and creation, C – Communication and cooperation, D – Morality and responsibility;
- (2) The number following the English letter represents the serial number of the requirements of basic academic attainment in the respective learning domain.

Learning domain A: Concept and cognition

- A-1 Understand the connotation and characteristic of information; know the presentation methods of digitisation of information, the advantages and disadvantages of digitised information.

[Reference Only]

- A-2 Know the basic principles of storing and computing information (data) on computer hardware.
- A-3 Understand the type and function of the computer operating system; be able to briefly illustrate the main tasks of the operating system on computer management.
- A-4 Know several major general-purpose application software; be able to explain the basic process of certain software processing the corresponding type of data.
- A-5 Understand the relationship between algorithm, programme and problem solving; be able to describe algorithm with virtual code.
- A-6 Know the function of network communication and the characteristics of several network types; be able to specify the responsibilities of the common network communication protocols.
- A-7 Understand the role of the artificial intelligence system and its process of perception and reasoning; be able to name some typical examples around.
- A-8 Know the commonly used computer programming languages; be able to draw the three basic flow control structures of the algorithm.

Learning domain B: Application and creation

- B-1 Be able to reasonably select hardware or software such as digital equipment the internet, etc., and obtain various types of information required quickly and effectively.
- B-2 Be able to proficiently handle regular files.
- B-3 Be able to synthetically design and create interactive multimedia works in terms of audio, video, animation and cartoon, etc.
- B-4 Be able to manage, maintain and optimise common computer software/hardware products or systems.
- B-5 Be able to use such tools as computer or mobile terminal to develop digital learning and life;
- B-6 Be able to apply advanced information technology system such as digital design and production.
- B-7 Be able to use spreadsheet software to conduct data processing and analysis of the practical issues around.
- B-8 Be able to use object-oriented programming languages to design simple application programmes, as well as to debug and publish them.

Learning domain C: Communication and cooperation

[Reference Only]

- C-1 Be able to appropriately and legally use social network platforms and other communication tools for communication and exchange.
- C-2 Be able to make good use of information technology to develop interdisciplinary communication as well as autonomous and cooperative learning.
- C-3 Be able to collaborate with others and use information technology to communicate and explore solution when facing problems.
- C-4 Make full use of the cloud tools to share information, communicate and share the diverse culture of Macao.

Learning domain D: Morality and responsibility

- D-1 Be able to pay attention to the laws and regulations related to information technology, integrating into a civilised and healthy digital life.
- D-2 Be able to pay attention to the development of information technology; actively participate in experiencing and applying the result of information technology.
- D-3 Be able to openly share and spread the excellent information culture; take a part in the construction of Macao's information society culture.
- D-4 Recognise the hidden crisis of the network (Internet addiction, cyber-bullying, online dating trap, etc.); be able to establish the correct attitude in using the Internet; refuse to accept, disseminate and release bad online information as well as false and fraud information.
- D-5 Be able to understand that application of information technology will bring positive and negative impact, be a responsible citizen in the information era.
- D-6 Understand the ethical impact of information technology development on society; identify moral issues in the information era.