Schola Europaea / Office of the Secretary-General

Pedagogical Development Unit

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ICT – Complementary course – S6-S7

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1.   General Objectives of the European Schools

The European Schools have the two objectives of providing formal education and of encouraging pupils' personal development in a wider social and cultural context. Formal education involves the acquisition of competences – knowledge, skills and attitudes across a range of domains. Personal development takes place in a variety of spiritual, moral, social and cultural contexts. It involves an awareness of appropriate behaviour, an understanding of the environment in which pupils live, and a development of their individual identity.

These two objectives are nurtured in the context of an enhanced awareness of the richness of European culture. Awareness and experience of a shared European life should lead pupils towards a greater respect for the traditions of each individual country and region in Europe, while developing and preserving their own national identities.

The pupils of the European Schools are future citizens of Europe and the world. As such, they need a range of competences if they are to meet the challenges of a rapidly-changing world. In 2006 the European Council and European Parliament adopted a European Framework for Key Competences for Lifelong Learning. It identifies eight key competences which all individuals need for personal fulfilment and development, for active citizenship, for social inclusion and for employment:

1. communication in the mother tongue
2. communication in foreign languages
3. mathematical competence and basic competences in science and technology
4. digital competence
5. learning to learn
6. social and civic competences
7. sense of initiative and entrepreneurship
8. cultural awareness and expression

The European Schools' syllabuses seek to develop all of these key competences in the pupils.

2.   Introduction

IT is possibly the fastest developing field in the last decades. Computers (in all shapes and sizes) and the Internet have acquired a very important role in most domains of our every day's life. In the same way, education is unimaginable without a strong presence of IT tools and resources.

The European Schools ICT steering committee, throughout its latest ICT-plan, has proposed to create this working group in order to:

1. Update the secondary school ICT-syllabus for Year 6&7 so as to integrate the many developments in ICT in the last decade.

2. Provide attainment descriptors for the ICT-syllabuses to function alongside the new marking scales.

3. Establish a list of recommendations as how to integrate IT tools and resources in order to teach and learn in the most efficient way.

First of all, we strongly recommend reviewing the status of ICT as a subject within the European Schools curriculum in the light of the growing importance of ICT.

3. Didactic principles

3.1. General principles

The secondary cycle of the European Schools needs to perform the dual task of providing formal, subject-based education and of encouraging pupils' personal development in a wider social and cultural context.

On the one hand, formal education involves understanding concepts and processes. It aims at acquiring knowledge and skills in order to be able to apply what has been learnt within each subject area and across subjects.

On the other hand, pupils will learn to describe, analyse, interpret, have a critical view and apply their acquired knowledge and skills in a creative and original way in a wide range of social, scientific and cultural contexts.

Computer use involves questions of law, ethics and democracy, such as copyright, freedom of speech and freedom of information and people's right to privacy. For the future computer users will require both a creative approach to computer technology, and awareness of legal and democratic aspects of the technology.

In a European School we aim at integrating both personal and academic aspects of education by developing awareness in our pupils of both their own local identity and the richness of European cultures. This results in a constellation of behaviours and attitudes that demonstrate clear respect for the traditions of others while at the same time showing pride of their own identities.

3.2. Subject-specific principles

Since the world of ICT is changing so rapidly, one of the two main goals of this new syllabus are, on one hand, to provide the pupils with the basic knowledge and fundamental skills and, on the other hand, to empower them to become independent and autonomous learners. In this sense, pupils should acquire a range of skills that will allow them to continue learning by themselves.

- The pupils will be able to use the information and communication technologies as tools to research, select, process and distribute information.
- The pupils will be able to critically differentiate the varying quality and sources of information. They will learn to use information in a respectful way, quote and refer to sources.
- The pupils understand the fundamental functionality of hardware and software.
- The pupils will be able to develop skills in how to continue to learn and how to apply new tools in ICT for solving problems in general.
- The pupils will be aware of the constant reality of security risks in an IT environment.

This syllabus aims to improve the teaching of ICT because it is a guideline through the topics of the important present technologies and it will give a vision of future developments.

To meet those aims it is important to update this syllabus regularly.

A very important issue of the ICT course is to provide the training students need to use new technologies in the daily school life which cannot be included in other subjects.

4. Learning objectives

4.1 Year 6 and 7

Most of the students who choose ICT in this cycle are willing to take computer science at University. The aim of this course is to understand the principles which lie behind modern technologies and be able to plan, execute and control a project.

In these two years the students will go deeper into the topics, which were taught in years 4-5 and will use more advanced features of applications.

In this cycle, the teacher can choose between a number of topics depending on the abilities and the interests of the students and the school's ICT infrastructure. So there are many options to make this course profitable for the students.

Program for year 6 and 7 (60 periods per year)

In this 2-year cycle, the teacher has to choose at least 4 of the given topics and can define the level of detail of the knowledge and skills. Cross-topic-projects are of course possible and encouraged. All projects should be adapted to the knowledge and skills of the students. According to the abilities of the students, the teacher can choose from or even add to the given knowledge and skills for each topic.

TOPIC	KNOWLEDGE & SKILLS	KEY WORDS AND EXAMPLES
Networks	**The student must know about:** • hardware of a network • topologies • protocols • network layers • different connection types • different operating systems • client-server-network vs. peer-to-peer-network • network security	 Switch, hub, router, NAS Star, mesh, tree, ring, bus, line, fully connected. IP, FTP, TCP. ISO-OSI-Model. RJ45, WLAN, Infrared, Bluetooth, mobile internet, etc. encryption, firewall, VLAN.
Object oriented programming	**The student must:** • Know different programming paradigms • Use a programming environment	 Object oriented, functional, logical, procedural, event driven, multi paradigm languages Different platforms, OS and programming languages.

	• Know and use data types • Understand and use variables • Use basic structures • Use diagrams or other visualization tools • Understand advanced concepts • Be able to implement and analyse algorithms	Visibility of variables Loops, conditions, arrays Flow charts, UML Trees, classes, methods, inheritance, information hiding, recursion etc. e.g. sorting algorithms
Advanced web design	**The student must be able to:** • Build interactive web pages • Use content management systems • Publish on the www • Make web applications	e.g. with PHP and SQL. Installing and setting up, adding content, managing users. Must be controlled by the teacher. e.g. with JavaScript.
Multimedia	**The student must do:** • advanced multimedia projects	Posters, videos, audio stories, podcasts etc.
Advanced word processing	**The student must be able to insert:** • Table of contents • List of figures	Organise the content in large documents.

	• List of tables • Fields, forms and templates • Automatic features	Mail merge, macros
Advanced spreadsheets	**The student must be able to use:** • pivot tables • macros • advanced functions • form control • spread sheet for problem solving	List box, radio button, scrollbar, checkbox For example in science, mathematics, economics and others subjects.
Advanced database	**The student must be able to use:** • data types • relationships • data modelling • programming language to manage data	Entity-relationship-model e.g. with SQL.
Computer graphics	**The student must be able to use:** • Static 3D graphics • Animated 3D graphics	e.g. architectural design. e.g. animated movies.

5.   Assessment

The assessment should be mainly formative. By means of teacher's observation, tests and self-assessment the students acquire an awareness of their level and their progress throughout the course. The basis of the assessment should be the learning objectives of the cycle.

6.   Conditions for an ICT course

- 1 computer for every pupil
- 1 computer for the teacher
- Internet connection
- Beamer (with interactive board) and/or monitoring software.
- Each pupil should have his/her own Office365 user account.

Attainment descriptors – ICT – S6 – S7

	A	B	C	D	E	F	FX
	(9.0 – 10 Excellent)	(8.0 - 8.9 Very good)	(7.0 - 7.9 Good)	(6.0 - 6.9 Satisfactory)	(5.0 - 5.9 Sufficient)	(3.0 - 4.9 Failed/Weak)	(0 - 2.9 Failed/Very weak)
Interpretation	Have a complete understanding of the problem. Translates the problem into a very clear and understandable solution. Choose the most suitable solution.	Have a very good understanding of the problem. Translates the problem into a clear and understandable solution. Choose the most suitable solution.	Have a good understanding of the problem. Translates the problem into a good and understandable solution. Choose a suitable solution.	Have a satisfactory understanding of the problem. Translates the problem into an understandable solution. Choose a satisfactory solution.	Have a sufficient understanding of the problem. Translates the problem into an understandable solution. Choose a sufficient solution.	Have a weak understanding of the problem. Is not able to translate the problem into an understandable solution.	Does not have an understanding of the problem.
Linking and applying	Makes connections between different parts of the syllabus and applies competences for solving problems in an excellent way. Applies competences in	Makes connections between different parts of the syllabus and applies competences for solving problems in a very good way.	Makes connections between different parts of the syllabus and applies competences for solving problems in a good way.	Makes connections between different parts of the syllabus and applies competences for solving problems in a satisfactory way. Sometimes applies basic competences	Makes connections between different parts of the syllabus and applies competences for solving problems in a sufficient way.	Attempts to make a connection between the syllabus and the problem	Is unable to make a connection between the syllabus and the problem

	unfamiliar areas in an excellent way.	Applies competences in unfamiliar areas in a very good way.	Applies basic competences in unfamiliar areas.	in unfamiliar areas.			
Problem solving	Solves challenging problems and reaches an excellent solution	Solves non-routine problems and reaches a very good solution	Solves routine problems and reaches a good solution	Solves routine problems and reaches a satisfactory solution	Solves routine problems and reaches a sufficient solution	Attempts to solve routine problems but does not reach a solution	/
Working in projects	Plan, execute and control a project in an excellent way. Makes necessary changes during the process to be able to develop an excellent end product in time.	Plan, execute and control a project in a very good way. Makes necessary changes during the process to be able to develop a very good end product in time.	Plan, execute and control a project in a good way. Makes some changes during the process to be able to develop a good end product in time.	Plan, execute and control a project in a satisfactory way. Able to develop a satisfactory end product in time.	Plan, execute and control a project in a sufficient way. Able to develop a sufficient end product.	Attempts to plan, execute and control a project. Not able to develop an end product.	/
Awareness	Excellent awareness of ethics, safety and security in ICT.	Very good awareness of ethics, safety and security in ICT.	Good awareness of ethics, safety and security in ICT.	Awareness of ethics, safety and security in ICT.	Awareness of ethics, safety and security in ICT.	Insufficient awareness of ethics, safety and security in ICT.	/
Attitude	Excellent attitude	Very good attitude	Good attitude	Satisfactory attitude.	Sufficient attitude	Very poor attitude	/