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NATIONAL CURRICULUM

COMPUTER SCIENCE

CLASSES XI-XII

2000

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FOR
CLASSES XI-XII

GOVERNMENT OF PAKISTAN
Ministry of Education
(Curriculum Wing)
Islamabad
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PREFACE

In pursuance of National Education Policy (1998-2010), a project on Curriculum Reforms (Vision 2010) is in progress. It aims to improve the quality of education through curriculum revision and textbook development. The highest priority has been assigned to the revision of curriculum with a view in update the entire course contents so that Ideology of Pakistan could permeate the thinking of young generation and help them with necessary conviction and ability.

Believing in participatory approach the Ministry of Education requested the provincial governments/Curriculum Bureaus to draft need based curricula in all the subjects for classes I through XII. Consequent upon this the Government of the Punjab attempted five initial drafts in Science and Mathematics. The Bureaus of Sindh, N.W.F.P. and Baluchistan furnished their comments on the previous as well as proposed carricula. To synchronize the feedback, the Ministry of Education appointed National Curriculum Development Committees. The panels of the committees were comprised of curriculum developers, subject specialists, educationists, teachers of universities , schools and colleges. The representatives of National Curriculum Bureau and Provincial Curriculum Bureaus were also represented on the panels. The committees thoroughly analyzed and synthesized the comments. Global experiences of curriculum development were also kept in view while revising/ updating the National Curriculum.

In the light of the above considerations, the committees revised the existing National Curriculum in Elementary Science (I-VIII), Physics, Chemistry, Biology (IX-XII), Statistics (XI, XII), Computer Science (IX-XII) and Mathematics (I-XII). The philosophy underlying National Curriculum is Islam and Ideology of Pakistan as set by the Parliament Act X, 1976. The objectives of the National Curriculum are framed in the light of the objectives of the latest National Education Policy (1998-2010). Pursoseful learning competencies are suggested in each subject. These aim to provide the learners, skills for continuing education, civilized behaviour and attitude to become useful and peaceful citizens. The objective is also to provide them with the skills for economic development. The curriculum has been made more representative and responsive to the Ideology of Pakistan and social needs. We still believe that curriculum development is a continuous process and can be made more responsive. The Ministry would welcome comments from all concerned. This will help us in making the curriculum more effective and need based.

The Ministry of Education appreciates the contributions of all the Provincial Governments/ Curriculum Bureaux and the National Curriculum Development Committees.

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INTRODUCTION

Fast growing computer science education has taken its due place in our education system. Both in public and private sectors, it is flourishing rapidly and has become an integral part of our socio-economic life. In order to varying our future generation intellectually and skilfully at par with the global experiences we introduced the subject of compute science at secondary and higher secondary levels as an optional subject in 1990, in schools and colleges which were equipped with the facilitation.

The earlier curriculum in Computer Science had the course contents of preliminary nature focussed on brief introduction to components of computer, Dos and number system followed by programming language. Now, several now dimensions both in Software and Hardware have emerged. To keep our generation updated with the modern world , it has been greatly felt to upgrade the existing National Curriculum. Growth of this discipline is driven both by the market forces and new intellectual concepts. Therefore the existing curriculum has been modified keeping in view the same principle.

Application packages such as Word Processor, Spread Sheet and Data Base have also been included in the subject .Apart from imparting knowledge of C/Visual Basic, the emphasis has been given on learning Computer Science concepts through hands-on practice. This will have the benefit of being acceptable in the IT market along with being equipped with the conceptual understanding .

Each level is followed by a list of practicals. Effort is made to make it at par both in contents and weightage wise, with other pure science disciplines being taught at Higher secondary level for the successful implementation ,a strategy for teachers training, developing textbooks and scheme of examination has been suggested separately.

OBJECTIVES

The objectives for introducing Computer Science at Higher Secondary level are to:

1. understand the basic concepts, theories, principles and laws of Computer Science and their applicantion in daily life;

2. develop mathematical manipulation skills for designing different language programmes in Computer Science;

3. understand and appreciate the role of Information Technology in socio-economic and cultural development of society;

4. develop skills for using and promoting internet techniques;

5. provide sound but solid basis for further studies in the discipline of Computer Science and Information Technology.

SYLLABUS IN COMPUTER SCIENCE FOR CLASSES XI-XII

A. Theory:
   Part –1 (Class –XI)

Topics	Weightage %age
Basics of Information Technology	75%
Basic Concepts of IT • Hardware Vs software • Input and Output Devices • Operating system Vs Computer Programs • Basic Units of Data Storage, Storage & Memory • Systems Development	10%
Information Networks • The Technology of Workgroup Computing • The Benefits of E-mail • What is the Internet and How it is useful? • Lan Vs Wan • Concepts, Modals, Standards, Network Topologies	10%
Data Communication • Introduction of Data Communication • Types of Data • Encoding different types of Data • Transmission media • Modem	10%
Applications and use of Computers • Computers and the opportunities offered by their use • Types of System Encountered in Everyday Life, home, Business, Industry, Education • Understand how Computers can simplify our work practices	10%
Hard ware and Systems Software • Computer Architecture - Block diagram of Computer (CPU, RAM, ROM, Input/Output, Data Bus, Address Bus, Control Bus and Ports) - Register, Program Counter (PC), Memory Address Register (MAR), Memory Buffer Register (MBR), Instruction Register (IR), Stack. • Computer Operations - Simple Machine Instructions Format - Processing Machine Instructions (fetohdecode-execute) • Understand the Functionality of Different Types of Software	25%
Security, Copyright and the Law • Viruses and Anti-Virus issues • Data protection and privacy issues • Data protection legislation and copyright issues	10%

USE OF APPLICATION SOFTWARE	25%
OPERATING SYSTEMS (WINDOWS)	5%
• Introducing GUI Operating System	
• OS Components and Selection Techniques	
• Starting to Use GUI operating system	
• File and Disk Management	
• Control Printing Jobs	
WORD PROCESSING	8%
• Starting to Use Word Processor	
• Font, Paragraph, Page Formatting	
• Introducing Tables and Columns	
• Using the Clipboard	
• Printing	
• Tables, Text Boxes, Graphics and Wordart	
SPREAD SHEET	7%
• Introduction to Spread Sheet Packages	
• Spread Sheet Layout	
• Formatting and Customizing Data	
• Formulas, Functions and Named Ranges	
• Introducing charts	
• Printing Worksheets and Charts	
INTERNET BROWSING AND USING E-MAIL	5%
• Introduction to Browsing	
• Addresses, Links and Downloading	
• Searching the Internet	
• E-mail & Newsgroup	

Topics	Weightage %age
Data Basics • Introduction to Database concepts • Data Concepts, Terminology and usage • Database Design and Table Creation • Formatting a Table • Relationships • Locating and Replacing Information • Creating Simple Queries • Creating calculated Fields • Introducing forms • Formatting and Creating Forms • Formatting and Creating Reports	40%
PROGRAMMING using C OR PROGRAMMING using VISUAL BASIC	60%
Option I : Outline for C • Characteristics of High level Programming Languages • Basic Structure of Programme • Creating, Editing and Saving a Source Programme • Compiling, Linking and executing a Program • Variables, character, integer, long integer, floating point, double precision. • Input/output, printf, scanf, format specifirer, field width specifier. • Operators: Arithmetic, Relational, Logical Operators. • Comments. • Loops: for loop, while loop, do-while. • Decision: if statement, if-else Statement, else-if, Switch Statement, Conditional Operator. • Importance of Functions • Simple functions • Function Passing Arguments and Returning Values • Open file, Read, Write, Append and Close File OR Option II: Outline for Visual Basic • I/O Statements • Control statements • Working with forms • Variables and Arrays • Functions and Procedures • Basic Active x Controls. • Drawing with visual basic • Advance Active x Controls • Data base Programming with Visual Basic • The Active Data Objects • Scripting objects • Visual Basic and the Web	

B. Practicals

Part-I (Class XI)

WINDOWS

1.
- Use of Start Menu
- Manage Program Group & Document Group
- How to access Search Group
- Customize the Desktop

2. Use of Windows Help

3. Use of Windows Accessories
- Word Pad
- Calculator
- Paint

4.
- Managing files and folders using My computer
- Managing files and folders using Windows Explorer
- Managing Recycle Bin Operations

5.
- Installation of given printer driver
- Setting up different properties of printer
- Managing the ques of printing jobs.

MS WORD

1.
- Open and save files in specified path or New Folder.
- Selection of text by different methods and applying different operations. Copying, Moving (by Clipboard and Drag & Drop methods) Deletion.

2. Formatting text (Bold, Underline, Font, Colour etc)

3. Use of Undo and Redo

4. Use of Text Alignment, Indenting and managing space. Also use of Bullets and Numbering

5. Use of Page Setup including Page Margin, Size, Paper Source and Layout.

6. Skills of Printer Settings

7. Use of Tables and Columns

8. Use of Spell Check Grammar and Thesaurus.

9. Use of shortcuts

MS-EXCEL

1. Inserting & Deleting Cells, Rows and Columns

2. Managing Worksheets

3. Formatting and Customizing Data

4. Use of Formulas and Functions (formatting numbers, decimal places, column & rows setup etc).

5. Drawing of different types of charts

6. Use of Page Setup and Printing Configurations

7. Use of shortcuts.

INTERNET EXPLORER

1. Send/receive email to single user, multiple users.

2. Attach/Detach files with mail.

3. Browsing Internet.

4. Use of shortcuts

5. proper use of search engines

Part-II (Class XII)

MS-ACCESS

1. Creating different tables and assign primary key

2. Create simple queries using wizard and design view.

3. Create relationship between tables

4. Create simple forms using wizards and design view

5. Create reports using wizards and design view

6. Use of summary and calculated fields

VISUAL BASIC

1. Creat a simple form to add two numbers using textbooks and buttons.

2. Create a simple form to perform other arithmetic computations (multiply, divide, subtract).

3. Create a form to display table of a given integer.

4. Create a form which generates series of numbers within given limits using FOR loop.

5. Create a form which generates series of numbers within given limits using DO WHILE loop.

6. Find factorial of N using any loop statement, read value from a text box and write it in another text box.

7. Define a programme to read use salary from a text box and calculate its tax depending upon the bracket in which it falls (using if-elseif-else).

8. Create a function which returns areas of circle of a given radius.

9. Use a form to save/retrieve data from user in text books and save it to a MS ACCESS table.

10. Use text boxes, combo boxes, tree-list to save/retrieve data to/from MS Access table.

11. Use different property sheets to change appearance and format of text item.

12. Use property sheet to modify form background properties

PRACTICALS FOR C-LANGUAGE

Exp.1	Writing a program which prints a text of 4 lines consisting of characters, integer values and floating point values using printf statement.
Exp. 2	Writing a program that reads and prints the data using the Escape Sequence, (Asking the name , age, height and gender of the student using scant and print statements)
Exp. 3	Writing a program, which uses operators (calculate the area of triangles, volume of spheres and arrange the resultant values in ascending order).
Exp. 4	Writing a program which uses 'for' loop statement, (Generate the multiplication table from 2 to 20)
Exp. 5	Writing a program which uses 'while' loop and Nested 'while' loop, (Use 'for' loop and continue the process in 'while' loop satisfying this condition).
Exp. 6	Finding the factorial of N using 'while' loop, read value of N using scant and print the factorial of various N.
Exp. 7	Draw a checkerboard and print it using if-else statement, and extend the program using Nested if-else .
Exp. 8	Writing a program which uses a 'switch' statement and breaks the program if certain condition is observed. Repeat the program with 'case' statement.
Exp. 9	Writing a function, which generates factorial of N and calls this function in the 'main' program.
Exp. 10	Writing a program which uses multiple arguments in a function. (Develop a user-defined function to generate a rectangle. Use the function for passing arguments to draw different sizes of rectangles and squares).

RECOMMENDATIONS

TEXTBOOKS

The Syllabus for Class XI has been modified by including new topics like, Computer Architecture, Data Communication and Computer Networking, and a sizeable contents includes hand-on practice about fundamental Applications in the computer lab. This will provide greater expertise to students in developing their own expertise in the market oriented IT applications. The proposed syllabus for this class now is a balanced blend of new concepts and IT requirements of the market. This makes it imperative that textbooks, according to the revised syllabus, should be made available to the students as early as possible.

The syllabus for class XII includes programming in C-language or Visual Basic, which has replaced FORTRAN programming. The flexibility of option has been provided to facilitate the institutions to adopt one of the languages depending on the resources available. In addition, the subject of database has also been included. It merited inclusion, firstly because this will help the students greatly in the job market, and secondly it is one of the fundamental concepts of computer science.

QUALIFICATION OF TEACHERES

For Class XI, XII following qualifications are suggested for the recruitment of lecturers to teach Computer Science studies:

1. M.Sc. (Computer Sciences) or equivalent from a recognized University/Institute.

2. M.Sc. (Physics, Mathematics or Statistics) with post-Graduate Diploma in Computer Science from a recognized University/Institute.

TRAINING OF TEACHERS

It is suggested that the teachers selected to teach subject of Computer Science should go through a teachers training programme in this subject. For this, the nearest University or Institutions offering short term or refresher courses may be requested to arrange such activities during summer vacations.

DELIVERY OF THE COUUICULM FOR CLASS XI-XII

- For Class XI, six periods per week for theory and four periods per week for practical are proposed.

- For Class XII, six periods per week of theory and four periods per week for practical are proposed.

EXAMINATION

CLASS-XI

It is suggested that for class XI, the question paper shall consist of NINE questions. QuestionNo.1 of 20% marks, being objective type, shall be compulsory. The remaining questions shall have equal weightage. The students may attempt FOUR questions apart from question No.1. The parts of the individual questions may be drawn from different sections of syllabi. The paper setting will be such that it covers 75% of conceptual part and 25% of application part.

Weightage of conduct of practicals on MS Word and Spread Sheet will be of 25 marks and viva/voca of 5 marks.

Paper	Marks	Time
Theory	70	3 Hours
Practical	30	2 Hours
Total	100	5 Hours

Class XII

It is proposed that the latest available version of Turbo C compiler or Visual Basic for language and Access for database be provided in the lab. However, Oracle (if available) in a particular college or institute is acceptable.

It is suggested that for Class-XII, the question paper shall consist of NINE questions. Question No.1 of 20% marks, being objective type, shall be compulsory. The remaining questions shall have equal weightage. The students may attempt FOUR questions apart from questions No.1. The parts of the individual questions may be drawn from different sections of syllabi.

Weightage of conduct of practical an Visual Basic/C-language will be of 25 marks and viva/voca of 5 marks.

Paper	Marks	Time
Theory	70	3 Hours
Practical	30	2 Hours
Total	100	5 Hours

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