

**Nagaland Board of School Education
Kohima**

NOTIFICATION NO. 117/2021

Dated Kohima, the 4 December, 2021

NO.NBE-1/Ad-CS(10)/2020-21:: In reference to the Notification No. 28/2021 dated Kohima, the 6th April, 2021, it is hereby notified for the information of all the Higher Secondary Schools and Colleges registered with the Board opting Computer Science as an elective subject that the Class XII syllabus of Computer Science is revised. The revised/new syllabus will be introduced with effect from academic session 2022.

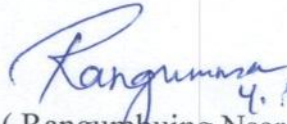
The new syllabus is enclosed as Annexure.

Sd/- Asano Sekhose
Chairman

NO.NBE-1/Ad-CS(10)/2020-21/ 2242 Dated Kohima, the 4 December, 2020

Copy to:

1. The Heads of all Registered schools having Computer Science subject under NBSE, Kohima.
2. The Principal Secretary to the Government of Nagaland, Department of School Education & SCERT, Kohima for information.
3. The Principal Director, School Education, Kohima, Nagaland, for information.
4. The Director, SCERT, Kohima, Nagaland for information.
5. Office copy.


4.12.2021
(Rangumbing Nsarangbe)
Secretary

CLASS – XII
COMPUTER SCIENCE

Unit-Wise weightage**Part – A External****Marks: 70**

Unit	Topics	Marks
1	Programming and Computational Thinking – 2	30
2	Computer Networks	15
3	Data Management – 2	15
4	Society, Law and Ethics – 2	10
Total		70

Part – A: External**UNIT 1: PROGRAMMING AND COMPUTATIONAL THINKING – 2 30 marks****Python Basics I: Fundamentals, Conditional Statements and Looping**

Introduction, Introduction to Python, Python Fundamentals, Conditional Statements Revisited, Looping.

Python Basics II: List, Tuple, Dictionary and Strings

Introduction, Lists, Tuple, Associate Arrays and Dictionaries, Strings.

Functions:

Introduction, Features of a Function, Basic Terminology, Definition and Invocation, Types of Function, Types of Function: Arguments and Return Type, Default Values and Positional Parameters, Implementing Search, Call by Reference, Scope.

Recursion:

Introduction, Recursion versus Iteration, Factorial, Power, Fibonacci, Binary Search, Greatest Common Divisor.

Python Packages:

Introduction, Creating Modules and Packages in Python, Accessing Objects of a Module, Numpy.

File Handling:

Introduction, The File Handling Mechanism, The Open Function and File Access Modes, Python Functions for File Handling, Implementation and Illustrations.

Algorithmic Efficiency:

Introduction, Algorithms: Definition and Characteristics, Notations: Pseudocode, Flow Chart, Strategies for Problem Solving: Recursion versus Iteration. Asymptotic Notation, Complexity, Illustrations, Best-Case, Worst-Case and Average-Case Complexity.

Data Visualization:

Introduction, The Plot Function, The Pie Chart, The Bar Chart.

Data Structures I:

Introduction, Classification of Data Structures, Abstract Data Type, Arrays, Lists.

Rangumma

Stacks and Queues:

Introduction, Stack, Implementation of Stack, Applications of Stack, Infix to Postfix, Postfix to Infix Evaluation of Postfix, Queue, Implementation of Queue, Applications of Queues.

UNIT – 2: COMPUTER NETWORKS

15 marks

Introduction to Computer Networks I:

Introduction, Terminology, Types of Networks, Cables, Architecture, Network Topology, Devices, IPV4, Address Space, Cloud Computing, Internet of Things.

Introduction to Computer Networks II:

Introduction, Modulation, OSI Protocol Suite, TCP/IP Protocol Suite, Hyper Text Transfer Protocol: HTTP, File Transfer Protocol, POP3, IMAP, SMTP, Sending E-Mail, Carrier Sense Multiple Access, Routing, Error Detection, Cellular Protocols, Network Commands, Miscellaneous Topics.

UNIT – 3: DATA MANAGEMENT – 2

15 marks

Structured Query Language I: Revision

Introduction, Viewing all Tables, Select Statement, Updating Tables, Cartesian Product, Join.

SQL II:

Introduction, Sample Database, SQL Functions, GROUP BY and HAVING.

Introduction to Django:

Introduction, Introduction to Django, Model-View-Template, Installation, Creating a Sample Project in Django, Creating an Application in Django.

Interfacing Python:

Introduction, View Existing Database, Create Database, View Existing Table in a Database, Create Tables, Create Primary Key, Describe Table, ALTER TABLE, Adding Column to a Table, Inserting Data into a Table, Inserting More than one Record in a Table, SELECT QUERY, Order by, DELETE, UPDATE.

UNIT – 4: SOCIETY, LAW AND ETHICS – 2

10 marks

Society, Law and Ethics:

Introduction, Plagiarism, Intellectual Property, Licensing, Cyber Crimes, Identity Thefts, Phishing, Credit Card Frauds, Cyber Stalking, Cyber Bullying, Illegal Downloading and Digital Piracy, Information Technology Act 2000, Electronic Waste Management.



Part – B: Practical**30 Marks**

Sl no	Unit Name	Marks
1.	Lab Test (10 marks)	
	Python program (60% logic + 20% documentation + 20% code quality)	7
	Small Python program that sends a SQL query to a database and displays the result. A stub program can be provided.	3
2.	Report File + viva (9 marks)	
	Report file: Minimum 21 Python programs. Out of this at least 4 programs should send SQL commands to a database and retrieve the result; at least 1 program should implement the web-server to write user data to a CSV file.	7
	Viva voce based on the report file	2
3.	Project + viva (11 marks)	
	Project (that uses most of the concepts that have been learnt)	8
	Project viva voce	3

1. Programming in Python:

- Recursively find the factorial of a natural number.
- Read a file line by line and print it.
- Remove all the lines that contain the character 'a' in a file and write it to another file.
- Write a Python function $\sin(x, n)$ to calculate the value of $\sin(x)$ using its Taylor series expansion up to n terms. Compare the values of $\sin(x)$ for different values of n with the correct value.
- Write a random number generator that generates random numbers between 1 and 6 (simulates a dice).
- Write a recursive code to find the sum of all elements of a list.
- Write a recursive code to compute the n^{th} Fibonacci number.
- Write a Python program to implement a stack and queue using a list data-structure.
- Write a recursive Python program to test if a string is a palindrome or not.
- Write a Python program to plot the function $y = x^2$ using the pyplot or matplotlib libraries.
- Create a graphical application that accepts user inputs, performs some operation on them, and then writes the output on the screen. For example, write a small calculator. Use the tkinter library.
- Open a webpage using the urllib library.
- Compute EMIs for a loan using the numpy or scipy libraries.
- Take a sample of 10 phishing e-mails and find the most common words.

2. Data Management: SQL and web-server:

- Find the min, max, sum, and average of the marks in a student marks table.
- Find the total number of customers from each country in the table (customer ID, customername, country) using group by.
- Write a SQL query to order the (student ID, marks) table in descending order of the marks.
- Integrate SQL with Python by importing the MySQL module
- Write a Django based web server to parse a user request (POST), and write it to a CSV file.



3. Project

The aim of the class project is to create something that is tangible and useful. This should be done in groups of 2 to 3 students, and should be started by students at least 6 months before the submission deadline. The aim here is to find a real world problem that is worthwhile to solve. Students are encouraged to visit local businesses and ask them about the problems that they are facing. For example, if a business is finding it hard to create invoices for filing GST claims, then students can do a project that takes the raw data (list of transactions), groups the transactions by category, accounts for the GST tax rates, and creates invoices in the appropriate format. Students can be extremely creative here. They can use a wide variety of Python libraries to create user friendly applications such as games, software for their school, software for their disabled fellow students, and mobile applications. Of course to do some of this projects, some additional learning is required; this should be encouraged. Students should know how to teach themselves.

If three people work on a project for 6 months, at least 500 lines of code is expected. The committee has also been made aware about the degree of plagiarism in such projects. Teachers should take a very strict look at this situation, and take very strict disciplinary action against students who are cheating on lab assignments, or projects, or using pirated software to do the same. Everything that is proposed can be achieved using absolutely free, and legitimate open source software.

Prescribed textbook:

**Computer Science with Python -New Age International Publishers by Harsh Bhasin
7/30 A, Daryaganj, New Delhi-110002**

