KAVAYITRI BAHINABAI CHAUDHARI
NORTH MAHARASHTRA UNIVERSITY, JALGAON

Semester- wise Code Structure

B. Sc. (Honors/ Research) Programme

Computer Science

As per NEP-2020 for Affiliated Colleges

With effect from June-2024

Year (Level)	Sem.	Faculty	Subject-I (M-1)	Subject-II (M-2)	Subject-III (M-3)	Open Elective (OE)	VC, SEC (VSEC)	AEC, VEC, IKS	CC, FP, CEP, OJT, RP	Min. Credits for the Year (Sem)	Degree.
1 (4.5)	Sem-I	Science	DSC-1 (2T) DSC-2 (2P)	DSC-1 (2T) DSC-2 (2P)	DSC-1 (2T) DSC-2 (2P)	OE-1(2T)	----	AEC-1 (2) (Eng) VEC-1 (2) (EA) IKS (2)	CC-1 (2)	44 (22+22)	UG Certificate In Faculty
	Sem-II	Science	DSC-3 (2T) DSC-4 (2P)	DSC-3 (2T) DSC-4 (2P)	DSC-3 (2T) DSC-4 (2P)	OE-2(4T)	----	AEC-2 (2) (Eng) VEC-2 (2) {CI}	CC-2 (2)		
	Credit: 1ˢᵗ Year		08	08	08	06	---	10	4	44	

Note:
- T: Theory Course, P: Practical course, **Number in bracket indicate credit allotted.**
- **The courses which do not have practical, 'P' will be treated as 'T'**
- If student select subject other than faculty in the subjects M-1, M-2, & M-3, then that subject will be treated as Minor subject, and can not be selected as Major at Second year.

Abbreviations:	
• **T:** Theory Course • **P:** Practical course • **DSC:** Discipline Specific Core Course • **DSE:** Discipline Specific Elective Course • **MIN:** Minor subject • **VSEC:** Vocational skill and Skill Enhancement courses • **VC:** Vocational Skill Courses • **SEC:** Skill Enhancement Courses • **GE/OE:** Generic/Open elective • **CEP:** Community engagement and service	• **CC -** Co-curricular Course • **VEC:** Value Education Courses • **IKS: Indian Knowledge System** • **AEC: Ability Enhancement Courses** • **Eng: English** • **MIL: Modern Indian language** • **CI: Constitution of India** • **EA: Environment Awareness** • **OJT: On Job Training: Internship/ Apprenticeship** • **RP: Research Project** • **RM: Research methodology**

Note:
1. **Syllabi of AEC, AEC, VEC, IKS, CC, will be displayed separately by KBCNMU.**
2. **Science student will Choose OE offered by Faculty of Commerce and Management orHumanities.**

Subject Short Name:		
Sr	**Name of Subject**	**Short Name**
1	Biochemistry	BC
2	Biotechnology	BT
3	Botany	BO
4	Chemistry	CS
5	Computer Science	CS
6	Data Science	DS
6	Electronics	EL
7	Environmental Science	EV
8	Geography	GG
9	Geology	GE
10	Mathematics	MT
11	Microbiology	MB
12	Physics	PH
13	Statistics	ST
14	Zoology	ZO

Semester-wise Code structure for B. Sc (Honors/Research) Computer Science Programme as perNEP2020, for Affiliated Colleges w.e.f .– June 2024.

B. Sc (Honors/Research) – First Year, SEMESTER – I, Level – 4.5

Subject	Course	Course Type	Course Code	Course Title	Credits	Teaching Hours / Week			Marks			
									Internal (CA)		External (UA)	
						T	P	Total	T	P	T	P
(M-1)	DSC-1	DSC	CS-111	C Programming-I	2	2			20	---	30	---
	DSC-2	DSC	CS-112	Lab on C Programming-I	2	-	4	4	---	20	---	30
OE	OE-1	OE	CS-114	Word Processing with Google Docs (Hands on)	2	2	--	2	20	--	30	--
VEC	VEC-1	VEC	ES-115	Environmental Studies	2	2	--	2	20	--	30	--
IKS	IKS	IKS	IK-115	IKS (Generic)	2	2	--	2	20	--	30	--
CC	CC-1	CC	CC-I	Select Any ONE from the Basket (A/B/C/D/E/F/G)	2	2	--	2	20	--	30	--
AEC	AEC-1	AEC	ENG-113	English for All: Oral Communication	2	2	--	2	20	--	30	--

Semester-wise Code structure for B. Sc (Honors/Research) Computer Science Programme as perNEP2020, for Affiliated Colleges w.e.f. – June 2024.

B. Sc (Honors/Research) – First Year, SEMESTER – II, Level – 4.5

Subject	Course	Course Type	Course Code	Course Title	Credits	Teaching Hours / Week			Marks			
									Internal (CA)		External (UA)	
						T	P	Total	T	P	T	P
(M-1)	DSC-3	DSC	CS-121	C Programming-II	2	2	--	2	20	--	30	--
	DSC-4	DSC	CS-122	Lab on C Programming-II	2	--	4	4	--	20	--	30
OE	OE-2	OE	CS-124	Google Apps (Hands on)	4	4	--	4	40	--	60	--
VEC	VEC-2	VEC	CI-125	Constitution of India	2	2	--	2	20	--	30	--
CC	CC-2	CC	CC-II	Select Any ONE from the Basket (A/B/C/D/E/F/G)	2	2	--	2	20	--	30	--
AEC	AEC-2	AEC	ENG-123	English for All: Written Communication	2	2	--	2	20	--	30	--

<table>
<tr><td colspan="2" align="center">Course Code: CS-111
Course Title: C Programming-I</td></tr>
</table>

Course Code: CS-111	**Course Category: Core Course (DSC)**
Course Title: C Programming-I	**Type: Theory**
Total Contact Hours: 30 (2/week)	**Course Credits: 02**
College Assessment (CA) Marks: 20 Marks	**University Assessment (UA): 30 Marks**

Course Objectives:
- To develop the logical ability of the student.
- Basic concepts to be cleared using suitable examples.
- Different approach towards the problem.
- To handle the errors and find a suitable solution.
- Debugging the code

Course Outcomes:

At the end of the course, students will be able to
- Learn the basic principles of programming.
- Develop of logic using algorithm and flowchart.
- Acquire information about data types.
- Understanding of input and output functions.
- Enhance advanced concepts using program.

Course Content:

UNIT-1. Preliminary Concepts   **(05 L, 06 M)**
    1.1 Introduction to Computer
    1.2 Block Diagram of Computer
    1.3 Input Devices and Output Devices
    1.4 What is Algorithm? , Steps for creation of Algorithm.
    1.5 What is Flowchart?, Symbols for drawing Flowcharts, Examples
    1.6 Programming Languages: High level, Middle Level, Low Level

UNIT-2. Basics of 'C' Program   **(07 L, 08 M)**
    2.1 History of 'C' Programming language
    2.2 Structure of C-program, Compilation, Execution and Debugging of C-program
    2.3 Variables, Declaration of variables, keywords
    2.4 Data types and Qualifiers
    2.5 Constants and types of constants, Comments
    2.6 Input Output Statements (Standard and formatted)
    2.7 Introduction and features of 'C' preprocessor
    2.8 Directives: #define, File inclusion (#include)

UNIT -3. Operators and Expression   **(07 L, 06 M)**
    3.1 Operators –Arithmetic, Relational, Logical, Assignment, Compound assignment operator (short hand assignment), Bitwise, Increment-Decrement, Conditional Operator, Special Operator – Comma, sizeof operator,
    3.2 Type Conversion – implicit and explicit
    3.3 Library Functions: abs (), sqrt( ), pow( ), ceil( ), floor( )

UNIT -4. Conditional Statements and looping   **(06 L, 06 M)**
    4.1 If Statement, if-else Statement, nested if-else Statement, else-if ladder, Switch Statement
    4.2 Break, continue and goto statements
    4.3 Looping Concepts
    4.4 While, do-while, for loop Nested loops Concept

UNIT-5. Arrays   **(05 L, 06 M)**

    5.1.Definition: Array: declaration and Initialization

    5.2.Types of array(One Dimensional and Multidimensional)

    5.3.Advantages and disadvantages of array

    5.4.Applications of array

Reference Books:

1. V. Rajaraman, "Fundamentals of Computers", PHI publication, ISBN: 8120340116,9788120340114

2. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sahni, Sanguthever

3. Programming in ANSI C. (6th Ed.) – Balaguruswami - Tata McGraw Hill Publication

4. Programming In C (2nd Ed.) - Ashok N. Kamthane - Pearson Education

5. The C Programming Language - DENNIS M. RITCHIE- AT&T Bell Laboratories Murray Hill, New Jersey

6. Let us C – (15th Ed.) - Yashwant Kanetkar - BPB Publications

7. Programming in C - Reema Thareja - Oxford University Press

Course Code: CS-112	
Course Title: **Lab on C Programming-I**	
Course Code: CS-112	**Course Category: Core Course (DSC)**
Course Title: Lab on C Programming-I	**Type: Practical**
Total Contact Hours: 60 (4/week)	**Course Credits: 02**
College Assessment (CA) Marks: 20 Marks	**University Assessment (UA): 30 Marks**

Course Objectives:
- To study various data types, arrays and functions in C
- To understand input-output and, control and iterative statements in C

Course Outcomes:

On completion of the course, students will be able to–
- Formulate an algorithm and draw flowchart for the given problem
- Implement the given algorithm in C
- Write programs using appropriate data types and control structures in C

Practical List:

1. Demonstration of use of data types, simple operators (expressions)

2. Demonstration of decision making statements (if and if-else, nested control statements)

3. Demonstration of decision making statements (switch case)

4. Demonstration of use of while loops, for loops, do-while loops, nested loops

5. Demonstration of exit, goto, continue, break.

6. Demonstrations of Structure and Union.

7. Demonstration of writing C programs in modular way (use of user defined functions)

8. Demonstration of call by value, call by reference and recursive functions

9. Demonstration of use of arrays (1-D array, 2-D arrays) and functions

10. Demonstration of Standard Library Function.

<table>
<tr><td colspan="2" align="center">**Course Code: CS-114**
Course Title: **Word Processing with Google Docs (Hands on)**</td></tr>
<tr><td>**Course Code: CS-114**</td><td>**Course Category: Open Elective Course (OE)**</td></tr>
<tr><td>**Course Title: Word Processing with Google Docs (Hands On)**</td><td>**Type: Theory**</td></tr>
<tr><td>**Total Contact Hours: 30 (2/week)**</td><td>**Course Credits: 02**</td></tr>
<tr><td>**College Assessment (CA) Marks: 20 Marks**</td><td>**University Assessment (UA): 30 Marks**</td></tr>
<tr><td colspan="2">**Course Objectives**:
• To familiarize students with Google Docs
• To develop students' proficiency in document formatting
• To facilitate collaborative document editing
• To explore advanced features and customization options.</td></tr>
<tr><td colspan="2">**Course Outcomes:**

• Proficiency in using Google Docs
• Effective document formatting skills
• Enhanced collaboration skills
• Understanding of advanced features.</td></tr>
</table>

Course Content:

Unit 1: Chapter 1: Introduction to Google Docs   **(08 L, 12 M)**
    1.1 Overview of word processing and its significance.
    1.2 Introduction to Google Docs: history, features, advantages.
    1.3 Creating a Google account and accessing Google Docs.
    1.4 Exploring the Google Docs interface
    1.5 Use of toolbar, menus, and settings.

Unit 2: Basic Document Formatting   **(08 L, 12 M)**
    2.1 Creating and saving documents: naming conventions, choosing templates
    2.2 Basic text formatting: font styles, sizes, colors, and alignments.
    2.3 Paragraph formatting: indentation, spacing, line spacing.
    2.4 Using special characters, symbols, and emojis in documents.
    2.5 Working with headers, footers, and page numbers.
    2.6 Inserting and formatting images, shapes, and drawings in documents.

Unit 3: Advanced Document Editing and Collaboration   **(08 L, 12 M)**
    3.1 Advanced text editing features: find and replace, spelling and grammar check.
    3.2 Collaboration tools: sharing documents, commenting, suggesting edits.
    3.3 Version history: tracking changes, reverting to previous versions.
    3.4 Working offline with Google Docs: enabling offline access, syncing changes.
    3.5 Utilizing Google Drive integration for seamless document storage and organization.
    3.6 Exporting and importing documents in various formats: Word, PDF, plain text, etc.
    3.7 Managing and organizing documents with folders and labels in Google Drive.
    3.8 Utilizing advanced search operators in Google Drive for efficient document retrieval.

Unit 4: Enhancing Productivity with Google Docs   **(06 L, 09 M)**
    4.1 Creating and formatting tables: adding rows, columns, merging cells.
    4.2 Using Google Docs for research and citations: citing sources, adding footnotes.
    4.3 Integrating with other Google Workspace apps: Google Drive, Google Sheets, Google Slides.

4.4 Automating tasks with Google Docs: using templates, creating custom add-ons.

4.5 Inserting and formatting images, shapes, and drawings in documents.

4.6 Using advanced table features: sorting, filtering, pivot tables, and conditional formatting.

4.7 Collaborative document automation with Google Apps Script.

4.8 Creating and using document templates for efficiency and consistency.

4.9 Utilizing third-party add-ons for extended functionality and customization.

Reference Books:

1. "Google Drive and Docs in 30 Minutes", by Ian Lamont

2. "Google Docs: The Unofficial Guide" by Lisa A. Bucki

3. "Google Workspace for Dummies" by Steve Schwartz

Course Code: CS-121	
Course Title: **C Programming-II**	
Course Code: CS-121	**Course Category: Core Course (DSC)**
Course Title: C Programming-II	**Type: Theory**
Total Contact Hours: 30 (2/week)	**Course Credits: 02**
College Assessment (CA) Marks: 20 Marks	**University Assessment (UA): 30 Marks**

Course Objectives:
- To develop the logical ability of the student.
- Basic concepts to be cleared using suitable examples.
- Different approach towards the problem.
- To handle the errors and find suitable solution.
- Debugging the code

Course Outcomes:

At the end of the course, students will be able to
- Learn the basic principles of programming.
- Develop of logic using algorithm and flowchart.
- Acquire the information about data types.
- Understanding of input and output functions.
- Enhance advanced concepts using program.

Course Content:

Unit-1 Function   **(05 L, 06 M)**

  1.1 Definition and Need of Function

  1.2 Declaration and Prototypes

  1.3 Function calling (Call by value, call by reference)

  1.4 Function with return and Function with argument

  1.5 Recursion

  1.6 String Function : strcpy(), strlen(), strcmp(), strcat(), strrev()

Unit-2 Pointers   **(07 L, 06 M)**

  2.1 Introduction

  2.2 Address and arguments

  2.3 Declaration, accessing value through a pointer

  2.4 Operations on Pointers: array of pointer, Function and pointer, pointer to pointer

  2.5 Dynamic memory allocation and releasing dynamically allocated memory.

Unit-3 Structure and union   **(07 L, 06 M)**

  3.1 Introduction. Declaration and accessing of structure and union

  3.2 Need of structure and union

  3.3 Nested structure

3.4 Array of structure

Unit-4 Graphics (06 L, 06 M)

4.1 Introduction to Graphics in C

4.2 Graphics functions: Initgraph(), putpixel(),closegraph(),outtextxy(),
setcolor(),line(),circle(),rectangle(),ellipse(),arc(), bar()

Unit-5 File handling in C (05 L, 06 M)

5.1 Concept of files, records, field

5.2 File Processing-fopen() , fclose(),fprintf(),fscanf(),getc(), putc(),getw(),putw() etc.

5.3 Various mode of file opening and closing files.

5.4 Command line arguments

Reference Books:

1. Programming in ANSI C. (6th Ed.) – Balaguruswami - Tata McGraw Hill Publication

2. Programming In C (2nd Ed.) - Ashok N. Kamthane - Pearson Education

3. The C Programming Language - DENNIS M. RITCHIE- AT&T Bell Laboratories Murray Hill, New Jersey

4. Let us C – (15th Ed.) - Yashwant Kanetkar - BPB Publications

5. Programming in C - Reema Thareja - Oxford University Press

<table>
<tr><td colspan="2" align="center">**Course Code: CS-122**
Course Title: Lab on C Programming-II</td></tr>
</table>

Course Code: CS-122	**Course Category: Core Course (DSC)**
Course Title: Lab on C Programming-II	**Type: Practical**
Total Contact Hours: 60 (4/week)	**Course Credits: 02**
College Assessment (CA) Marks: 20 Marks	**University Assessment (UA): 30 Marks**

Course Objectives:
- To study various data types, arrays and functions in C
- To understand input-output and, control and iterative statements in C

Course Outcomes:

On completion of the course, students will be able to–
- Formulate an algorithm and draw flowchart for the given problem
- Implement the given algorithm in C
- Write programs using appropriate data types and control structures in C

Practical List:

1. Program to illustrate concept of function (call by value, call by reference, recursive)
2. Write program using Function with return and Function with argument
3. Program using user defined function to find length of string
4. Write the program using std. string functions (like strlen(). strcat(),strcmp(), strrev(), strcpy()etc.)
5. Program using pointers (arrays, functions, structures)
6. Program using structures (at least two practical)
7. Program using graphics function (at least two practical using all graphics functions)

<table>
<tr><td colspan="2" align="center">Course Code: CS-124

Course Title: Google Apps (Hands on)</td></tr>
</table>

Course Code: CS-124	**Course Category: Open Elective Course (OE)**
Course Title: Google Apps (Hands on)	**Type: Theory**
Total Contact Hours: 60 (4/week)	**Course Credits: 04**
College Assessment (CA)Marks: 40 Marks	**University Assessment (UA): 60 Marks**

Course Objectives:
- Understand the overall structure and components of Google Workspace.
- Learn to create, organize, and share folders and files in Google Drive.
- Develop spreadsheets, input data, and perform basic calculations.
- Create professional presentations using Google Slides.
- Design and distribute surveys and quizzes using Google Forms also
- Analyze responses and integrate data with Google Sheets.

Course Outcomes:

- Students will demonstrate proficiency in using Google Workspace apps, including Google Sheets, Google Slides, Google Forms, and Google Drive.
- Students will effectively collaborate with others using Google Workspace tools, utilizing features like real-time editing, commenting, and sharing permissions to manage and contribute to group projects.
- Students will create, format, and manage professional documents, spreadsheets, and presentations using Google Docs, Sheets, and Slides, incorporating advanced features such as templates, add-ons, and custom formatting.
- Students will analyze data using Google Sheets, performing functions such as sorting, filtering, creating pivot tables, and using complex formulas and functions.
- Students will organize and manage files and folders in Google Drive, understanding how to use storage efficiently, set permissions, and synchronize files across devices.
- Students will design, distribute, and analyze surveys using Google Forms, interpreting the data through the integrated response summary and exporting data for further analysis.

Course Content:

Unit 1: Introduction to Google Workspace   **(10 L, 15 M)**

1.1 Overview of Google Workspace
1.2 What is Google Workspace?
1.3 Overview of core apps (Gmail, Google Drive, Google Docs, Google Sheets, Google Slides, Google Calendar)
1.4 Setting up a Google Account
1.5 Creating a Google account
1.6 Navigating the Google Workspace interface

Unit 2: Google Drive   **(10 L, 15 M)**

2.1 Introduction to Google Drive
2.2 Uploading and organizing files
2.3 Sharing and collaboration features
2.4 File management and storage tips

Unit 3: Google Sheets   **(10 L, 15 M)**

3.1 Introduction to Google Sheets
3.2 Creating and formatting spread sheets

3.3 Basic formulas and functions

3.4 Data visualization (charts and graphs)

3.5 Collaboration and data sharing

Unit 4: Google Slides   **(10 L, 15 M)**

4.1 Introduction to Google Slides

4.2 Creating and designing presentations

4.3 Using themes and templates

4.4 Adding multimedia (images, videos, animations)

4.5 Collaboration and presenting tips

Unit 5: Google Forms   **(10 L, 15 M)**

5.1 Introduction to Google Forms

5.2 Creating surveys and quizzes

5.3 Customizing form settings and appearance

5.4 Analyzing responses

5.5 Integrating with Google Sheets

Unit 6: Google Mobile Apps   **(10 L, 15 M)**

6.1 Introduction to Google Mobile Apps

6.2 Overview of the Google ecosystem and its integration across mobile platforms

6.3 Benefits of using Google Mobile Apps

6.4 Downloading and Installing Apps, Account Management

6.5 Key Productivity Apps: Gmail Mobile App, Google Calendar Mobile App

6.6 Media and Entertainment: Google Photos Mobile App, YouTube and YouTube Music Mobile Apps

Reference Books:

1. Nancy Conner, "Google Apps: The Missing Manual", O'Reilly Media; 1st edition (July 1, 2008), ISBN-10: 0596515790, ISBN-13: 978-0596515799.
2. Scott La Counte, "The Ridiculously Simple Guide to Google Apps (G Suite): A Practical Guide to Google Drive Google Docs, Google Sheets, Google Slides, and Google Forms", SL Editions (August 20, 2019), ISBN-10: 1621077020, ISBN-13: 978-1621077022.
3. James Ferreira, "Google Apps Script, 2nd Edition", O'Reilly Media, Inc., ISBN: 9781491946183