Savitribai Phule Pune University

(Formerly University of Pune)

Four Year Degree Program
B.Sc.(Computer Science)

With

Major: Computer Science

(Faculty of Science and Technology)

Syllabi for
F.Y.B.Sc. (Computer Science)

(For Colleges Affiliated to Savitribai Phule Pune University)

Choice Based Credit System (CBCS) Syllabus
Under National Education Policy (NEP)
To be implemented from Academic Year 2024-2025

Title of the Course: B.Sc.(Computer Science)

Preamble:

The B. Sc. (Computer Science) and B. Sc. (Computer Science) (Honors) and (Research) course is systematically designed program with Computer Science as a major subject under the faculty of Science and Technology. The objective of the course is to prepare studentsto undertake careers involving problem solving using computer science and technologies, or to pursue advanced studies and research in computer science. The syllabus which comprises of Computer Science (Major) subject along with that of the three allied subjects (Mathematics, Electronics and Statistics) (Minor) covers the foundational aspects of computing sciences and also develops the requisite professional skills and problem solving abilities using computing sciences.

Introduction:

At the first year of under-graduation, the basic foundations of two important skills required for software development are laid. A course in problem solving and programming along with a course in database fundamentals forms the preliminary skill set for solving computational problems. The practical courses are designed to supplement the theoretical training in the year. Along with Computer Science (Major), VSC and SEC courses help in building a strong technical foundation. Another aspect of this course is IKS which tells about the rich heritage and advancement of India in the field of computation.

At the second year of under-graduation, computational problem solving skills are further strengthened by a course in Data structures, C++ and python programming. Software engineering concepts that are required for project design are also introduced. Essential concepts of computer networking are also introduced in this year. The practical course included in both semesters complements the theory courses. Field projects/ OJT are introduced so that student can implement the concept they have learnt in first year.

At the third year of under-graduation, all the subjects are designed to fulfill core Computer Science requirements as well as meet the needs of the software industry. Theory courses are adequately supplemented by hands-on practical courses. Major elective courses are taking care of recent advancement in the field of computer science. Minor and Skill Enhancement courses enable the students to acquire additional skills.

At the fourth year (honors) and (research) of under-graduation, all the subjects are designed to fulfill core Computer Science requirements as well as meet the needs of the software industry. Practical courses and field projects enable students to get hands on training. Various learning tracks are open through Major elective courses. Research methodology course will create interest among the students to carry research in the field of computer science.

Objectives:
- To develop problem solving abilities using a computer.
- To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
- To train students in professional skills related to Software Industry.
- To prepare necessary knowledge base for research and development in Computer Science.
- To help students build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.

Eligibility
  a) H.S.C.(10 + 2) Science stream with Mathematics.
  b) Three years diploma course after S.S.C.(10th std.) of Board of Technical Education conducted by Government of Maharashtra or its equivalent.

Programme Out comes:

PO No	Outcomes
PO1	Develop creative skills, critical thinking, analytical skills and research to address the real world problems using computational skills
PO2	Understand and apply mathematical foundation, computing and domain knowledge and develop computing models for defined problems
PO3	Understand software project management and computing principles with computing knowledge to manage projects in multidisciplinary environments
PO4	Illustrate the concepts of systems fundamentals, including architectures and organization, operating systems, networking and communication
PO5	Understand and apply the concepts of Digital Electronics, Computer Architecture, IoT etc.
PO6	Recognize the need for and develop the ability to engage in continuous learning as a Computing professional
PO7	Apply modern computing tools, skills and techniques necessary for innovative software solutions
PO8	Communicate effectively with the computing community as well as society by being able to comprehend effective documentations and presentations
PO9	Gain Self Discipline and commit Professional Ethics in global economic environment
PO10	Individual & Team Work: Ability to work as a member or leader in diverse team's in multidisciplinary environment
PO11	Identify opportunities, entrepreneurship vision and use innovative ideas to create value and wealth for the betterment of the individual and society

Savitribai Phule Pune University
Structure of UG Program as per NEP-2020
Name of Program :- B.Sc. (Computer Science)
Major Course:- Computer Science

Level:- 4.5 (First Year)   Sem:-I

Course Type	Course Code	Course Title	Credits		Teaching Scheme Hr/Week		Evaluation Scheme and Max Marks		
			TH	PR	TH	PR	CE	EE	Total
Subject 1	CS-101-T	Problem Solving using 'C' Programming	2		2		15	35	50
	CS-102-P	Lab Course based on CS-101-T		2		4	15	35	50
Subject 2	MTS-101-T	Mathematics	2		2		15	35	50
	MTS-102-P	Lab Course based on MTS-101-T		2		4	15	35	50
Subject 3	ELS-101-T	Electronic Science	2	2	2	4	15	35	50
	ELS-102-P	Lab Course based on MTS-101-T					15	35	50
IKS(2)	IKS100T	Generic IKS	2		2		15	35	50
GE/OE (2)	OE101CS / OE102CS / OE103CS	Office Automation I / Introduction to Computers and Basics of Internet / Introduction to Google Apps I	2		2		15	35	50
SEC (2)	SEC101CS	Statistical Methods for Computer Science I		2		4	15	35	50
AEC(2)	AEC101MAR/HIN	MIL-I (Hindi) / MIL-I (Marathi)	2		2		15	35	50
VEC(2)	VEC101ENV	EVS-I	2		2		15	35	50
Total			14	08	14	16			550

Level:- 4.5 (First Year)   Sem:-II

Course Type	Course Code	Course Title	Credits		Teaching Scheme Hr/Week		Evaluation Scheme and Max Marks		
			TH	PR	TH	PR	CE	EE	Total
Subject 1	CS-151-T	Advanced C Programming	2		2		15	35	50
	CS-152-P	Lab Course Based on CS-103-T		2		4	15	35	50
Subject 2	MTS-151-T	Mathematics	2		2		15	35	50
	MTS-152-P	Lab Course Based on MTS-103-T		2		4	15	35	50
Subject 3	ELS-151-T	Electronic Science	2		2		15	35	50
	ELS-152-P	Lab Course Based on ELS-103-T		2		4	15	35	50

GE/OE (2)	OE151CSP / OE152CSP / OE153CSP	Office Automation II / Computer Fundamentals / Introduction to Google Apps II		2		4	15	35	50
SEC(2)	SEC151CS	Statistical Methods for Computer Science II		2		4	15	35	50
AEC(2)	AEC151MAR/HIN	MIL-II (Hindi) / MIL-II (Marathi)	2		2		15	35	50
VEC(2)	VEC151ENV	EVS-II	2		2		15	35	50
CC(2)	CC151PE/NSS/NCC	Course from University Basket	2		2		15	35	50
Total			12	10	12	20			550

Note* : (i)The detailed syllabus of Mathematics, Electronic Science and Statistics will be published separately by respective boards.

(ii) The detailed syllabus of Generic IKS, MIL (Hindi), MIL (Marathi), EVS and CC will be provided by SPPU separately which is common to all courses.

Semester I

Savitribai Phule Pune University **F.Y.B.Sc. (Computer Science) - Sem – I** **Course Type: Subject 1 Code : CS-101-T** **Course Title :Problem Solving Using C Programming**		
Teaching Scheme 02Hrs/ week	No. of Credits 2	Examination Scheme IE : 15 marks UE: 35 marks

Prerequisites
- Previous knowledge of any programming concepts is assumed.
- Knowledge of mathematical operator.
- Student think the out of box ie imagination power.

Course Objectives
- To introduce the foundations of computing, programming and problem- solving using computers.
- To develop the ability to analyze a problem and devise an algorithm to solve it.
- To formulate algorithms, pseudocodes and flowcharts for arithmetic and logical problems.
- To understand structured programming approach.
- To implement algorithms in the 'C' language.
- To test, debug and execute programs.

Course Outcomes

On completion of the course, student will be able to :
- Explore algorithmic approaches to problem solving.
- Control the sequence of the program and give logical outputs.
- Understand and manage Input /Output operations in 'C' program
- Develop modular programs using control structures and arrays in 'C'.

Course Contents

Chapter 1	Problem Solving Aspects	5 Hrs

1.1. Introduction to problem solving using computers.

1.2. Problem solving steps.

1.3 Algorithms-definition, characteristics,examples, advantages and limitations.

1.4 Flowcharts - definition, notations, examples , advantages and limitations, Comparison with algorithms.

1.5 Programming Languages as tools, programming paradigms, types of languages

1.6 Compilation process (compilers, interpreters), linking and loading, syntax and semantic errors, testing a program

1.7 Good Programming Practices (naming conventions, documentation, indentation).

Chapter 2	**'C' Fundamentals**	**6Hrs**

2.1 History of 'C' language.

2.2 Application areas.

2.3 Structure of a 'C' program.

2.4 'C' Program development life cycle.

2.5 Function as building blocks.

2.6 'C' tokens

2.7 Character set, Keywords , Identifiers

2.8 Variables, Constants (character, integer, float, string, escape sequences, enumeration constant).

2.9 Data Types (Built-in and user defined data types).

2.10 Operators, Expressions, types of operators, Operator precedence and Order of evaluation.

2.11 Character input and output.

2.12 String input and output.

2.13 Formatted input and output.

Chapter 3	**Control Structures**	**6 Hrs**

3.1 Decision making structures:- if ,if-else, switch and conditional operator.

3.2 Loop control structures:- while ,do while, for.

3.3 Use of break and continue.

3.4 Nested structures.

3.5 Unconditional branching (goto statement).

Chapter 4	**Functions**	**6Hrs**

4.1 Concept of function, Advantages of Modular design.

4.2 Standard library functions.

4.3 User defined functions:- declaration , definition, function call, parameter passing (by value , by reference), return statement.

4.4 Recursive functions.

4.5 Scope of variables and Storage classes.

Chapter 5	**Arrays**	**7Hrs**

5.1 Concept of array.

5.2 Types of Arrays – One, Two and Multidimensional array.

5.3 Array Operations - declaration, initialization, accessing array elements.

5.4 Memory representation of two-dimensional array (row major and column major)

5.5 Passing arrays to function.

5.6 Array applications - Finding maximum and minimum, Counting occurrences, Linear search,

Sorting an array (Simple exchange sort, bubble sort), Merging two sorted arrays, Matrix operations (trace of matrix, addition, transpose, multiplication, symmetric, upper/ lower triangular matrix)

Reference Books:
R1. How to Solve it by Computer, R.G. Dromey, Pearson Education.
R2. Problem Solving and Programming Concept, Maureen Sprankle,7th Edition, Pearson Publication.
R3. C: the Complete Reference, Schildt Herbert, 4th edition, McGraw Hill
R4. A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard F. Gilberg, Cengage Learning India
R5. The 'C' programming language, Brian Kernighan, Dennis Ritchie, PHI
R6. Programming in C ,A Practical Approach, Ajay Mittal , Pearson
R7. Programming with C, B. Gottfried, 3rd edition, Schaum's outline Series, Tata McGraw Hill.
R8. Programming in ANSI C, E. Balagurusamy, 7th Edition, McGraw Hill.

Savitribai Phule Pune University
F.Y.B.Sc. (Computer Science) - Sem – I
Course Type: Subject 1 Code : CS-102-P
Course Title :Lab Course based on CS-101-T

Teaching Scheme 3 4 Hrs /Week	No. of Credits 2	Examination Scheme IE:15Marks UE: 35Marks

Prerequisites
- Previous knowledge of any programming concepts is assumed.
- Knowledge of mathematical operator.
- Student think the out of box ie imagination power.

Course Objectives.
- Explore and develop the algorithmic approaches to problem solving.
- Understand and implement modular programs using control structures and arrays in 'C'.
- Implement programming logic and also test, debug and execute programs.
- Implement Control the sequence of the program and give logical outputs.

Course Outcomes:-
On completion of this course, students will be able to:
- Explore and develop the algorithmic approaches to problem solving.
- Understand and implement modular programs using control structures and arrays in 'C'.
- Implement programming logic and also test, debug and execute programs.
- Implement Control the sequence of the program and give logical outputs.

Guidelines:

LabBook: The lab book is to be used as a hands-on resource, reference and record of assignment submission and completion by the student. The lab book contains the set of assignments which the student must complete as a part of this course.

Submission:

Problem Solving Assignments:

The problem solving assignments are to be submitted by the student in the form of a journalcontainingindividualassignmentsheets.EachassignmentincludestheAssignmentTitle, Problem statement, Date of submission, Assessment date, Assessment grade and instructors sign.

Programming Assignments:

Programs should be done individually by the student in the respective login. The codes should be uploaded on either the local server, Moodle, Github or any open source LMS. Print-outs of the programs and output may be taken but not mandatory for assessment.

Assessment:

Continuous assessment of laboratory work is to be done based on overall performance and lab assignments performance of student. Each lab assignment assessment will be assigned grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include- timely completion, performance, innovation, efficient codes and good programming practices.

Operating Environment:

For 'C' Programming:

Operating system: Linux

Editor: Any linux based editor like vi, edit etc.

Compiler: cc or gcc

LAB Course Contents
A) C Programming

Assignment 1	**Problem Solving Aspects**
1. Pseudo-code to programs. 2. Compilation process (compilers , interpreters), linking and loading, syntax and semantic errors, testing a program 3. Practices (naming conventions, documentation, indentation).	
Assignment 2	**'C' Fundamentals**
• 'C' tokens and Character set, Keywords , Identifiers • character, integer, float, string, escape sequences, enumeration constant. • Built-in and user defined data types and Operators, Expressions, types of operators,	

	Operator precedence and Order of evaluation.
Assignment 3	**Control Structures : Conditional Structures**
• Use of if ,if-else, and. • Use of Switch case • Use of conditional operator	
Assignment 4	**Control Structures : Loop Control Structures**
• Use of While loop • Use of Do While loop • Use of for lo • Use of break and continue. • Nested structures and goto statement.	
Assignment 5	**Control Structures : Break continue and Nested Loop**
• Use of break and continue. • Nested structures and goto statement.	
Assignment 6	**Functions**
• User defined functions:- declaration , definition, function call, parameter passing (by value), return statement. •	
Assignment 7	**Recursive Functions**
• Use of Recursive functions.	
Assignment 8	**Scope of variables**
• Use of Scope of variables • Use of Storage classes.	
Assignment 9	**One Dimensional Arrays**
• One Dimensional Arrays (1D) Operations - declaration, initialization, accessing array elements. •	
Assignment 10	**One Dimensional Arrays : passing array to function**
• Assignment on Passing 1D arrays to function	
Assignment 11	**One Dimensional Arrays : Array Operations**
• Finding maximum and minimum, Counting occurrences, Linear search,	
Assignment 12	**One Dimensional Arrays : Sorting and Searching**
• Sorting an array (Simple exchange sort, bubble sort (ie arrange the data in ascending and descending order))	
Assignment 13	**Two Dimensional Arrays : Basic Operations**
• Two and Multidimensional array(2D) Operations - declaration, initialization, accessing array.	
Assignment 14	**Two Dimensional Arrays : Passing 2D arrays to functions**

- Passing 2D arrays to function.
- Merging two sorted arrays,

Assignment 15	Two Dimensional Arrays : matrix operations

- Matrix operations :
  - Transpose
  - Addition,
  - Subtraction
  - Multiplication
  - Symmetric,

Diagonal/upper/ lower triangular matrix

Reference Books:

R1. How to Solve it by Computer, R.G. Dromey, Pearson Education.

R2. Problem Solving and Programming Concept, Maureen Sprankle,7th Edition, Pearson Publication.

R3. C: the Complete Reference, Schildt Herbert, 4th edition, McGraw Hill

R4. A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard F. Gilberg, Cengage Learning India

R5. The 'C' programming language, Brian Kernighan, Dennis Ritchie, PHI

R6. Programming in C ,A Practical Approach, Ajay Mittal , Pearson

R7. Programming with C, B. Gottfried, 3rd edition, Schaum's outline Series, Tata McGraw Hill.

R8. Programming in ANSI C, E. Balagurusamy, 7th Edition, McGraw Hill.

Note: Lab Book be prepared for this course by BOS.

Savitribai Phule Pune University F.Y.B.Sc. (Computer Science) - Sem – I Course Type: GE/OE Code : OE101CS Course Title :Office Automation I		
Teaching Scheme 02 Hrs/ week	No. of Credits 2	Examination Scheme IE : 15 marks UE: 35 marks

Prerequisites

- Previous knowledge of Computer concepts is assumed.
- Knowledge of Computer as operational tool is required.

Course Objectives

- To introduce the foundations of office automation especially word processing.
- To develop the ability to prepare the well formatted word documents.
- To prepare the documents using word processing tools such as tables, figures, shapes etc.

• To prepare the word documents using advanced automated features.		

Course Outcomes

On completion of the course, student will be able to :

- Prepare the professional word documents
- Explore various tools in the word processing software.
- Develop documents using word processing advanced tools.

Course Contents

Chapter 1	**Working with Documents**.	2 Hrs
1.1. Opening & Saving files, 1.2. Editing text documents, Inserting, Deleting, 1.3. Cut, Copy, Paste, Undo, Redo, 1.4. Find, Search, Replace, 1.5. Formatting page &setting Margins, 1.6. Converting files to different formats, 1.7. Importing & Exporting documents, Sending files to others, 1.8. Using Tool bars, Ruler, Using Icons, using help		
Chapter 2	**Formatting Documents**	**2 Hrs**
2.1 Setting Font styles 2.2 Font selection- style, size, colour, etc. 2.3 Type face - Bold, Italic, Underline, 2.4 , Case settings, Highlighting, Special symbols. 2.5 Setting Paragraph style. 2.6 Alignments, Indents, Line Space, Margins, 2.7 , Bullets & Numbering		
Chapter 3	**Setting Page Style**	**4 Hrs**
3.1 Formatting Page 3.2 Page tab : Margins, Layout settings, Paper tray 3.3 Border & Shading 3.4 Columns 3.5 Header & Footer 3.6 Setting Footnotes & End notes 3.7 Shortcut Keys; Inserting manual page break, Column break and line break 3.8 Creating sections & frames 3.9 Anchoring & Wrapping 3.10 Printing Documents		
Chapter 4	**Setting Document Styles**	**2 Hrs**
4.1 Table of Contents 4.2 Index 4.3 Page Numbering		

4.4 date & Time, Author, etc.

4.5 Creating Master Documents

4.6 Web page

Chapter 5	Creating Tables	7 Hrs

5.1 Table settings and Drawing - Inserting ClipArts, Pictures/Files etc.,

5.2 Borders, Alignments,

5.3 Insertion, deletion,

5.4 , Merging, Splitting,

5.5 Sorting,

5.6 Formula

Chapter 6	Special Features	6 Hrs

6.1 Inserting Formula, equation, symbols

6.2 Inserting Cliparts, pictures, objects, word art

6.3 Drawing: shapes, smart art, etc

6.4 Charts

6.5 Hyperlinks, bookmarks, cross-references, Digital Signature

Chapter 7	Tools	7 Hrs

7.1 Word Completion, Spell Checks,

7.2 Mail merge

7.3 Templates,

7.4 Creating contents for books, Creating Letter/Faxes, Creating Web pages 7.5 Hyperlinks, bookmarks, cross-references

7.5 Using Wizards

7.6 Tracking Changes, Security,.

Reference Books :

1. Illustrated Microsoft Office 365 & Word 2019 Comprehensive by Jennifer Duffy
2. Microsoft Word 365 2019 by Joan Lambert
3. Microsoft Word 2013 Bible by Lisa A Bucki

Savitribai Phule Pune University
F.Y.B.Sc. (Computer Science) - Sem – I
Course Type: GE/OE Code : OE102CS
Course Title : Introduction to Computers and Basics of Internet

Teaching Scheme	No. of Credits	Examination Scheme
02 Hrs/ week	2	IE : 15 marks
		UE: 35 marks

Prerequisites
• Basic knowledge of Computer concepts is assumed.
• Knowledge of Computer as operational tool is required.

Course Objectives
• To introduce the fundamental concepts of computers
• To introduce the basic concepts of Internet
• To develop the ability to analyses and use the computer peripherals effectively
• To develop the ability to analyses and use the internet effectively

Course Outcomes

On completion of the course, student will be able to :

- Use the computer peripherals effectively
- Use the internet for the day to day life
- Explore various applications available over the internet.

Course Contents

Chapter 1	Fundamentals of Computers	8 Hrs
1.1 Overview of a Computer-Definition, functionalities of Computer		
1.2 Generations and Classification of Computers		
1.3 Functional Components of a Computer		
1.4 Applications Of Computers		
1.5 Software and Hardware-Definition, types of software		
1.6 Introduction to various Operating systems-Windows,Linux,Android,IOS		

Chapter 2	Introduction to various Computer applications	6 Hrs
2.1 Various Explorers		
2.2 Editors such as Notepad, wordpad		
2.3 Calculator, calendar, etc		
2.4 , Paint.		
2.5 Various browsers		
2.6 Internet settings		

Chapter 3	Basics of Internet	6 Hrs
3.1 Definition and History of Internet		
3.2 Uses and Applications of Internet		
3.3 Definition of Web		
3.4 Website Address and URL		
3.5 Different types of Internet Connections:		
• Dial up Connection		
• Broad Band (ISDN, DSL, Cable)		
• Wireless (Wi-Fi, WiMax, Satellite, Mobile) naming convention		
3.6 Modes of Connecting Internet (Hotspot, Wi-Fi, USB Tethering)		

Chapter 3	Browsers and Email	10 Hrs

3.1 Search Engines

3.2 Web Browsers

- Popular Web Browsers (Microsoft Edge, Google Chrome, Mozilla Firefox,Safari, etc.)
- Popular Search Engines.(Google, Bing, Startpage ,DuckDuckGo etc..)

3.3 Portals

3.4 Social Networking sites, blogs

3.5 Using Browsers :

- Viewing webpage
- Downloading and uploading the website

3.6 E-mail:

- Configuring an E-mail Account
- Composing and Sending Mail
- Receiving, Replying to and Forwarding Mail
- Attachments to email

Reference Books:

1. Computer Fundamentals by P.K. Sinha &Priti Sinha, 3rd edition, BPB pub.
2.Fundamental of Computers – By V. Rajaraman B.P.B. Publications
3. The Internet Book by Douglas E Comer

E-Books and Online Learning Material

1. https://www.geeksforgeeks.org/computer-fundamentals-tutorial/
2. https://www.javatpoint.com/computer-fundamaentals

Savitribai Phule Pune University F.Y.B.Sc. (Computer Science) - Sem – I Course Type: GE/OE Code : OE103CS Course Title : Introduction to Google Apps I		
Teaching Scheme 02 Hrs/ week	No. of Credits 2	Examination Scheme IE : 15 marks UE: 35 marks

Prerequisites

- Basic knowledge of Computer concepts is assumed.
- Knowledge of Computer as operational tool is required.
- Knowledge of Internet is required

Course Objectives

- To introduce the foundations of various Google tools.
- To develop the ability to analyses and use the tools effectively

Course Outcomes

On completion of the course, student will be able to :

- Use the google tools for the day to day life
- Explore various applications available in the google tools.
- Develop the skills to implement the skills available in the google tools.

Course Contents

Chapter 1	**Gmail**	**2 Hrs**

   1.1 Configuring an E-mail Account
   1.2 Composing and Sending Mail
   1.3Receiving, Replying to and Forwarding Mail
   1.4 Attachments to email

Chapter 2	**Google Drive**	**3 Hrs**

   2.1 Opening the Drive
   2.2 Creating folders, google docs, google sheets, google slides
   2.3 Managing Files and folders
   2.4 Sharing files and folders and managing permissions
   2.5 Downloading the files and folders
   2.6 Uploading files and folders
   2.7 Printing files

Chapter 3	**Google Docs, Sheets and Slides**	**8 Hrs**

   3.1 Creating Google docs, sheets and slides
   3.2 Formatting the documents
   3.3 Managing the document permissions
   3.4 Uploading/downloading the documents
   3.5 Special features in the docs, sheets and slides

Chapter 4	**Google Forms**	**7 Hrs**

   4.1 Creating a google form
   4.2 Adding various styles of the questions
   4.3 settings of the google form
   4.4 Creating the links of the google form and sharing the link
   4.5 Creating and managing the permissions
   4.6 Managing the data collected through google form

Chapter 5	**Other Google tools**	**10 Hrs**

   5.1 Google Calendar
   5.2 Google Meet
   5.3 Google Chat
   5.4 Google Contacts
   5.5 Google Photos
   5.6 Google Maps

Reference Books:

1. Complete Beginners guide to Google Apps Script by Daniel Lawrie.

2.Google Apps made easy by James Bernstein
3. My Google Apps by Sherry Kinkoph Gunter

Semester II

SavitribaiPhule Pune University
F.Y.B.Sc. (Computer Science) - Sem – II
Course Type: MajorCourse Code : CS-151-T
Course Title :Advanced C Programming

Teaching Scheme 02Hrs/ week	No. of Credits 2	Examination Scheme IE : 15 marks UE: 35 marks

Prerequisites
- Problem Solving tools like algorithms, flowcharts and pseudocodes.
- Basic knowledge of 'C' language.

Course Objectives
- To study advanced concepts of programming using the 'C' language.
- To understand code organization with complex data types and structures.
- To work with files.

Course Outcomes
On completion of the course, student will be able to :
- Develop modular programs using control structures, function ,pointers, arrays, strings and structures
- Design and develop solutions to real world problems using C.
- Understand and repeat the sequence of instructions and points for a memory location.
- Identification, analyzation, development, verify and document the requirements for a computing environment.

Course Contents

Chapter 1	Pointers	8Hrs

1.1. Introduction to Pointers.
1.2. Declaration, definition, initialization, dereferencing.
1.3. Pointer arithmetic.
1.4. Relationship between Arrays & Pointers- Pointer to array, Array of pointers.
1.5. Multiple indirection (pointer to pointer).
1.6. Functions and pointers- Passing pointer to function, Returning pointer from function, Function pointer.
1.7. Dynamic memory management- Allocation(malloc(),calloc()), Resizing(realloc()), Releasing(free()).,
1.8. Memory leak, dangling pointers.
1.9. Types of pointers.

Chapter 2	Strings	6Hrs

2.1 String Literals, string variables, declaration, definition, initialization.
2.2 Syntax and use of predefined string functions

2.3 Array of strings.

2.4. Strings and Pointers

2.5. Command line arguments.

Chapter 3	Structures And Unions	8Hrs

3.1. Concept of structure, definition and initialization, use of typedef.

3.2. Accessing structure members.

3.3. Nested Structures

3.4. Arrays of Structures

3.5. Structures and functions- Passing each member of structure as a separate argument, Passing structure by value / address.

3.6. Pointers and structures.

3.7. Concept of Union, declaration, definition, accessing union members.

3.8. Difference between structures and union.

Chapter 4	File Handling	6Hrs

4.1. Introduction to streams.

4.2. Types of files.

4.3. Operations on text files.

4.4. Standard library input/output functions.

4.5. Random access to files.

Chapter 5	Preprocessor	2Hrs

5.1. Role of Preprocessor

5.2. Format of preprocessor directive

5.3. File inclusion directives (#include)

5.4. Macro substitution directive, argumented and nested macro

5.5. Macros versus functions

Reference Books:

R1. C: the Complete Reference, Schildt Herbert, 4th edition, McGraw Hill

R2. A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard

F. Gilberg, Cengage Learning India

R3. The 'C' programming language, Brian Kernighan, Dennis Ritchie, PHI

R4. Programming in C ,A Practical Approach, Ajay Mittal , Pearson

R5. Programming with C, B. Gottfried, 3rd edition, Schaum's outline Series, Tata McGraw Hill.

R6. Programming in ANSI C, E. Balagurusamy, 7th Edition, McGraw Hill.

SavitribaiPhule Pune University
F.Y.B.Sc. (Computer Science) - Sem – II
Course Type: MajorCourse Code : CS-151-P
Course Title :Lab Course based on CS-151-P

Teaching Scheme	No. of Credits	Examination Scheme

04Hrs/ week	2	IE : 15 marks UE: 35 marks

Prerequisites
- Problem Solving of mathematical operator and function and array.
- Basic knowledge of 'C' language.

Course Objectives
- To study advanced concepts of programming using the 'C' language.
- To understand code organization with complex data types and programming structures.
- To work with files and its types.

Course Outcomes

On completion of the course, student will be able to :
- Develop modular programs using function, pointers, arrays, strings and structures
- Design and develop solutions to real world problems using Advanced C programming.

Guidelines:

LabBook: The lab book is to be used as a hands-on resource, reference and record of assignment submission and completion by the student. The lab book contains the set of assignments which the student must complete as a part of this course.

Submission:

Advanced 'C' Programming Assignments:

The problem solving assignments are to be submitted by the student in the form of a journal containing individual assignment sheets. Each assignment includes the Assignment Title, Problem statement, Date of submission, Assessment date, Assessment grade and instructors sign.

Programming Assignments:

Programs should be done individually by the student in the respective login. The codes should be uploaded on either the local server, Moodle, Github or any open source LMS. Print-outs of the programs and output may be taken but not mandatory for assessment.

Assessment:

Continuous assessment of laboratory work is to be done based on overall performance and lab assignments performance of student. Each lab assignment assessment will be assigned grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include- timely completion, performance, innovation, efficient codes and good programming practices.

Operating Environment:

For Advanced 'C' Programming: Operating system: Linux Editor: Any linux based editor like vi, gedit etc. Compiler: cc or gcc	

LAB Course Contents

Advance C Programming

Assignment 1	Pointers : Operations on pointers

- Pointers - Declaration,
- definition, initialization, d
- dereferencing
- Pointer arithmetic.

Assignment 2	Pointers : Pointers and arrays

- Pointer to array,
- Array of pointers
- pointer to pointer

Assignment 3	Pointers :pointers and functions

- Passing pointer to function,
- Returning pointer from function,
- Function pointer

Assignment 4	Pointers :Dynamic Memory allocation

Dynamic memory management (Allocation)
- malloc(),
- calloc(),
- Resizing(realloc()),

Assignment 5	Pointers :dangling pointers and free

- Releasing (free ()).,
- dangling pointers

Assignment 6	Strings : basic operations

- String Literals, string variables, declaration, definition, initialization and Syntax and use of predefined string functions

Assignment 7	Strings : array of strings & pointers

- Array of strings and Pointers

Assignment 8	Structures : Basics

- Structure, definition and initialization, use of typedef.
- Accessing structure members and Nested Structures

Assignment 9	Arrays of Structures and functions

- Arrays of Structures and functions- Passing each member of structure as a separate argument,

	• Passing structure by value / address.
Assignment 10	Pointers and Structures
	Use of Pointers and Structures
Assignment 11	**Unions**
	Concept of Union, declaration, definition, accessing union members
Assignment 12	**Command line arguments : basics**
	• To access command-line arguments • Functions - atoi(), atol() and atof()
Assignment 13	**Command line arguments : use of files**
	• Arithmetic operation on arguments • Accessing string and file using command line arguments
Assignment 14	**File Handling**
	• Streams and Types of files. • Operations on text files. • Standard library input/output functions and Random access to files.
Assignment 15	**Preprocessor**
	• Preprocessor and Format of preprocessor directive • File inclusion directives (#include) • Macro substitution directive, argumented and nested macro and macros versus functions
Reference Books:	

R1. C: the Complete Reference, Schildt Herbert, 4th edition, McGraw Hill

R2. A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard
F. Gilberg, Cengage Learning India

R3. The 'C' programming language, Brian Kernighan, Dennis Ritchie, PHI

R4. Programming in C ,A Practical Approach, Ajay Mittal , Pearson

R5. Programming with C, B. Gottfried, 3rd edition, Schaum's outline Series, Tata McGraw
Hill.

R6. Programming in ANSI C, E. Balagurusamy, 7th Edition, McGraw Hill.

Note: Lab Book be prepared for this course by BOS.

Savitribai Phule Pune University **F.Y.B.Sc. (Computer Science) - Sem – I** **Course Type: GE/OE Code : OE151CS** **Course Title :Office Automation II**

Teaching Scheme 02 Hrs/ week	No. of Credits 2	Examination Scheme IE : 15 marks UE: 35 marks

Prerequisites
- Previous knowledge of Computer concepts is assumed.
- Knowledge of Computer as operational tool is required.

Course Objectives
- To introduce the foundations of office automation especially Presentation Skills.
- To develop the ability to prepare the well formatted powerpoint presentations.
- To prepare the presentations using powerpoint presentation tools such as tables, figures, shapes, images, audio, video etc.
- To prepare the presentations using advanced automated features such as animation, slide shows, etc.

Course Outcomes

On completion of the course, student will be able to :
- Prepare the professional presentations
- Explore various tools in the powerpoint presentation software.
- Develop documents using powerpoint advanced tools.

Course Contents

Chapter 1	**Introduction to Presentation**.	**5 Hrs**

1.1. Opening new presentation,
1.2. Different presentation templates,
1.3. Setting backgrounds,
1.4. Selecting presentation layouts

Chapter 2	**Creating and Formatting Presentation**	**8 Hrs**

2.1 Presentation style,
2.2 Adding text to the Presentation.
2.3 Adding style
2.4 Colour, gradient fills
2.5 Arranging objects
2.6 Adding Header & Footer
2.7 Slide Background, Slide layout

Chapter 3	**Adding Graphics and effects to Presentation**	**12 Hrs**

3.1 Inserting pictures, movies, tables etc into presentation,
3.2. Drawing Pictures using Draw
3.3. Setting Animation
3.4 Transition Effect

Chapter 4	**Printing and showing a presentation**	**5 Hrs**

4.1 Printing Handouts
4.2 Generating Standalone Presentation viewer

4.3 Presenting the presentation using various styles

Reference Books :
1. Microsoft Powerpoint by James Holler
2. Powerpoint for dummies, office 2021 Edition Doug Lowe
3. Learn Microsoft Office 2019 by Linda Foulkes

Savitribai Phule Pune University
F.Y.B.Sc. (Computer Science) - Sem – I
Course Type: GE/OE Code : OE152CS
Course Title : Computer Fundamentals

Teaching Scheme 02 Hrs/ week	No. of Credits 2	Examination Scheme IE : 15 marks UE: 35 marks

Prerequisites
• Basic knowledge of Computer concepts is assumed.
• Knowledge of Computer as operational tool is required.
Course Objectives
• To introduce the fundamental concepts of computers.
• To study the basics of Computer System
• To introduce the computer peripherals and other devices
• To learn how to configure computer devices
• To Learn Basic Commands of Operating system and application software
Course Outcomes
On completion of the course, student will be able to :
• Use the computers for the day to day life
• Learn the fundamental concepts of computer science
• Explore various applications available in the computers.
• Explain the needs of hardware and software required for a computation task
Course Contents

Chapter 1	**Introduction to Computers**	**7 Hrs**
1.1 Introduction, Characteristics of Computers,		
1.2 Block diagram of computer		
1.3 Computer Generations		
1.4 Types of computers and features- Mini Computers, Micro Computers, Mainframe Computers, Super Computers, Laptops and Tablets		

	1.5 Types of Programming Languages- Machine Languages, Assembly Languages, High Level Languages	
Chapter 2	**Introduction to Computer Peripherals**	**8 Hrs**
	2.1 Primary And Secondary storage devices	
	2.2 Primary storage devices – RAM, ROM, PROM, EPROM	
	2.3 Secondary Storage Devices - CD, HD, Pen drive	
	2.4 I/O Devices- Scanners, Digitizers, Plotters, LCD, Plasma Display	
	2.5 Pointing Devices –Mouse, Joystick, Touch Screen	
	2.6 Number Systems, Octal, Hexadecimal system Conversion, Simple	
	2.7 Addition, Subtraction, Multiplication, Division	
Chapter 3	**Number System**	**6 Hrs**
	3.1 Introduction to Binary Number System	
	3.2 Introduction to Octal Number System	
	3.3 Introduction to Hexadecimal Number System	
	3.4 Addition, Subtraction, Multiplication, Division	
Chapter 4	**Operating Systems**	**4 Hrs**
	4.1 Definition of Operating System	
	4.2 Functions of Operating System	
	4.3 Role of Operating System	
	4.4 Types of Operating System	
Chapter 5	**Introduction to Computer Networking**	**5 Hrs**
	5.1 Network definition Common terminologies: LAN, WAN, Node, Host, Workstation, bandwidth, Interoperability	
	5.2 Network Administrator,	
	5.3 Network Security	
	5.4 Network Components: Severs, Clients	
	5.5 Communication Media	
	5.6 Types of network: Peer to Peer, Clients Server	
Reference Books:		
1. Computer Fundamentals by P.K. Sinha &Priti Sinha, 3rd edition, BPB pub.		
2.Fundamental of Computers – By V. Rajaraman B.P.B. Publications		
3. Computer Networks – By Tennenbum Tata MacGrow Hill Publication		
E-Books and Online Learning Material		
3. https://www.geeksforgeeks.org/computer-fundamentals-tutorial/		
4. https://www.javatpoint.com/computer-fundamaentals		

Savitribai Phule Pune University

F.Y.B.Sc. (Computer Science) - Sem – I		
Course Type: GE/OE Code : OE153CS		
Course Title : Introduction to Google Apps II		
Teaching Scheme 02 Hrs/ week	No. of Credits 2	Examination Scheme IE : 15 marks UE: 35 marks

Prerequisites
- Basic knowledge of Computer concepts is assumed.
- Knowledge of Computer as operational tool is required.
- Knowledge of Internet is required

Course Objectives
- To introduce the specialized Google tools.
- To develop the ability to analyses and use the tools effectively and skillfully

Course Outcomes

On completion of the course, student will be able to :
- Use the google tools for the day to day life
- Explore various applications available in the google tools.
- Develop the skills to implement the skills available in the google tools.

Course Contents

Chapter 1	**Creating You Tube Channel**	**10 Hrs**
1.1 Creating a you tube channel 1.2 Managing the channel, permissions, playlists, etc 1.3 Uploading the videos on the channel 1.4 Live Streaming		
Chapter 2	**Creating a website**	**10 Hrs**
2.1 Creating a website 2.2 Managing home page 2.3 Creating Menus on the website 2.4 Adding pages to the site 2.5 Setting up themes 2.6 Adding tools such as tables, placeholders, hyperlinking, buttons, maps, etc 2.7 Publishing a site		
Chapter 3	**Google Classroom**	**10 Hrs**
3.1 Creating Google classroom 3.2 Creating a class 3.3 Streaming a class 3.4 Adding students to class 3.5 Adding class work : assignments, quiz, question, material, etc 3.5 Giving grades to the assignments		

3.6 joining a class (from student side)
Reference Books: 1. Complete Beginners guide to Google Apps Script by Daniel Lawrie.   2.Google Apps made easy by James Bernstein   3. My Google Apps by Sherry Kinkoph Gunter