Scheme A

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS
SCHEME AND SYLLABUS OF EXAMINATION FOR
Bachelor of Physical Science/B.A.
Duration 3 Years (6Semesters) w.e.f. Academic Session2023-24

Course Code	Course Title	Credit	L: T:P: CH	Internal Marks		External Marks		Total Marks	
				Th	Pr	Th	Pr	Min	Max
Major/Core Courses									
CC-A2		4	3 :0:1 :5	20	10	50	20	40	100
CC-B2		4	3 :0:1:5	20	10	50	20	40	100
B23-CC-C2	Problem Solving through C	4	3 :0:1:5	20	10	50	20	40	100
Minor/Vocational Courses									
B23-CC-M2	Word Processing	2	1 :0:1:3	10	05	20	15	20	50
Multidisciplinary Courses									
B23-MDC2	Digital Tools	3	2 :0:1 :4	15	05	35	20	30	75
Ability Enhancement Courses									
B23-AEC2	To be opted by student from the Central Pool	2	2 :0:0:2	15	-	35	-	20	50
Skill Enhancement Courses									
B23-SEC2	To be opted by student from the Central Pool	3	2 :0:1 :4	15	05	35	20	30	75
Value Added Courses									
B23-VAC2		2	2 :0:0:2	15	-	35	-	20	50
	Total	24							600

B23-CC-C2 Problem Solving through C

Max.Marks:100
Min.PassMarks:40

Internal Assessment Marks :30[Theory(20) + Practical(10)]
External End TermExamMarks:70 [Theory(50)+Practical(20)]

Time: Theory(3Hours),Practical(3Hours)

Credit:4

Course Objectives:

1. To learn the basics of C program, data types and input/output statements.
2. To understand different types of operators, their hierarchies and also control statements of C.
3. To implement programs using arrays and strings.
4. To get familiar with advanced concepts like structures, union etc. in C language.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Overview of C: History, Importance, Structure of C Program, Character Set, Constants and Variables, Identifiers and Keywords, Data Types, Assignment Statement, Symbolic Constant. Input/output: Formatted I/O Function-, Input Functions viz. scanf(), getch(), getche(), getchar(), gets(), output functions viz. printf(), putch(), putchar(), puts().

UNIT-II

Operators & Expression: Arithmetic, Relational, Logical, Bitwise, Unary, Assignment, Conditional Operators and Special Operators Operator Hierarchy;. Arithmetic Expressions, Evaluation of Arithmetic Expression, Type Casting and Conversion. Decision making with if statement, if-else statement, nested if statement, else-if ladder, switch and break statement, go to statement, Looping Statements: for, while, and do-while loop, jumps in loops.

UNIT-III

Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation. Functions: definition, prototype, function call, passing arguments to a function: call by value; call by reference, recursive functions. Strings: Declaration and Initialization, String I/O, String Manipulation Functions: String Length, Copy, Compare, Concatenate etc.

UNIT-IV

User defined data types: Structures - Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure member's initialization, Array of Structures;
Unions – Union definition; difference between Structure and Union.

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UNIT-V (PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on C Language during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Gottfried, Byron S., Programming with C, Tata McGraw Hill.
2. Balagurusamy, E., Programming in ANSI C, Tata McGraw-Hill.
3. Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
4. Yashwant Kanetker, Let us C, BPB.
5. Rajaraman, V., Computer Programming in C, PHI.
6. Yashwant Kanetker, Working with C, BP

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B23-CC-M2 Word Processing

Max.Marks:50
Min.PassMarks:20

Internal Assessment Marks   :15[Theory(10) + Practical(05)]
External End Term Exam Marks :35 [Theory(20)+Practical(15)]

Time: Theory(3Hours),Practical(3Hours)

Credit:2

Course Objectives:

1. To learn the basics of MS Word.
2. To understand various formatting options.
3. To familiarize the student with report writing..
4. To get familiar with concepts like table, mails merge.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Introduction to Word Processing, Development of the Word Processor, Design considerations for word processed documents, creating, opening and closing documents, working with multiple documents, saving documents, save an existing file under another name, Save different Versions

UNIT-II

Formatting Documents, Text Formatting, Paragraph Formatting, Text alignment, Tabs and its types, placing text at the tab position, Paragraph spacing, Working with lists, Paragraph borders and shading, Creating and Applying Styles

UNIT-III

Adding tables, Adding data to a table, Deleting a table, Add and delete columns and rows, Modifying columns and rows, Images, Inserting images, Modifying images, resize an image and charts

UNIT-IV

Mail Merge, Preparing the documents, creating the main document, creating the data source, Document formatting

UNIT-V(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on MS Word during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	4	-	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	-	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	6	-	
Total	10	5	

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Suggested Readings:

1. Taxali, Ravi Kant, "Computer Course", Mc Graw Hill Education, 2014.
2. Saxena , Sanjay, "A First Course in Computers", Vikas Publishing House, 2015.
3. Balagurusami , E., "Fundamentals of Computers", Mc Graw Hill, 2009.
4. Weverka, Peter, "Office 2010 All-in-One for Dummies", Wiley Publishing, Inc 2010

B23-CSE-204 Digital Tools

Max.Marks:75
Min. Pass Marks:

Time: Theory(3Hours),Practical(3Hours)

Internal Assessment Marks :20[Theory(15) + Practical(05)]
External End TermExamMarks:55[Theory(35)+Practical(20)]

Credit:3

Course Objectives:

1. Understand the basic concepts of data, information and searching.
2. understand concept of TPS & MIS
3. learn about Ecommerce Models
4. learn Security threats

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Introduction to internet: concept, application and uses of Internet, Internet services, search engines
Information Technology and Business: concepts of data, information and information system, effects of IT on business

UNIT-II

Types of information system: Transaction Processing System (TPS), Management Information System (MIS).
Introduction to E-commerce; e-commerce and world wide web; e-commerce application services;

UNIT-III

Ecommerce models: B2B, B2C, C2C; electronic data interchange: benefits, components of EDI, EDI implementation.

UNIT – IV

Security issues in e-commerce, M-commerce and e-governance, difference m-commerce and e-commerce

UNIT-V (PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on Digital tools during the laboratory work.

The students should be able to work on Internet – communication through Internet. Research using online sources – surveys, research on social networking sites.Vlogs, Bhim, banking UPIs, Ayushman app.

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Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	4	2	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class tsest etc	4	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	3	
Mid-Term Exam	7	-	
Total	15	5	

Suggested Readings:

1. Bajaj, Kamlesh K and Debjani Nag, E-commerce – The Cutting Edge of Business, Tata McGraw Hill (P) Ltd., New Delhi.
2. Greenstein, Marilyn, and Todd M. Feinman, Electronic Commerce, Tata McGraw Hill, New Delhi.
3. Leon, Alexis: Fundamental of Information Technology, Vikas Publication House (P) Ltd., New Delhi
4. Minoli, Daniel, Internet and Intranet Engineering, Tata McGraw-Hill Publishing Co Ltd., New Delhi.
5. Whitley, David, E-Commerce: Strategy, Technology and Applications, Tata McGraw-Hill Publishing Co Ltd., New Delhi.

Scheme C.

DEPARTMENTOFCOMPUTERSCIENCEANDAPPLICATIONS
SCHEME AND SYLLABUS OFEXAMINATION FOR
Bachelor of Science (Honours/ Honours with Research) in Computer Science
Duration 4Years (8 Semesters) w.e.f.AcademicSession2023-24

Course Code	Course Title	Credit	L: T:P: CH	Internal Marks		External Marks		Total Marks	
				Th	Pr	Th	Pr	Min	Max
Major/Core Courses									
B23-CSE-201	Object Oriented Programming using C++	4	3 :0:1:5	20	10	50	20	40	100
B23-CSE-202	Introduction to Web Technologies	4	3 :0:1:5	20	10	50	20	40	100
Minor/Vocational Courses									
B23-CSE-203	Concepts of Operating Systems	4	3 :0:1:5	20	10	50	20	40	100
Multidisciplinary Courses									
B23-CSE-204	Digital Tools	3	2 :0:1:4	15	05	35	20	30	75
Ability Enhancement Courses									
	Will be selected by the central pool	2	2 :0 :0:2	15	-	35	-	20	50
Skill Enhancement Courses									
	Will be selected by the central pool	3	2 :0:1:4	15	05	35	20	30	75
Value Added Courses									
	Will be selected by the central pool	2	2 :0 :0:2	15	-	35	-	20	50
	Total	22							550

B23-CSE-201Object Oriented Programming using C++

Max.Marks:100
Min.PassMarks:40

Internal Assessment Marks : 30[Theory(20)+Practical(10)]
External End Term Exam Marks: 70[Theory(50)+Practical(20)]

Time: Theory(3Hours),Practical(3Hours)   **Credit:**4

Course Objectives:

1. Learn the basics of C++program, data types and input/output statements.
2. Understand different types of operators, their hierarchies and also control statements of C++.
3. Implement programs using arrays and strings.
4. Get familiar with OOPS concepts in C++ language.
5. To implement the programs based on various concepts of C++.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Introduction to C++: About C++, Character Set, Keywords, Identifiers, Constants, Punctuators, Date Types: User-Defined, Built-in, Derived Data Types, Access Modifiers. Unformatted and Formatted I/O Operations. I/O using extraction and extraction operators, Type Conversion, Type Casting. Operators in C++: Arithmetic, Relational, Logical, Bitwise, Ternary, Precedence & associativity of Operators.

UNIT-II

Control Structures: if statement, if-else statement, nested if, if-else-if ladder, switch...case statement, break and continue, go to statement, nested switch...case statement, Loops: while loop, do...while loop, for loop. Arrays and strings: Array definition, initialization multidimensional arrays, Manipulation of array elements, String declaration and initialization, Manipulations, String handing functions.

UNIT-III

Functions: Declaration and Definition, return values, arguments, passing parameters by value, call by reference, call by pointer, Recursions, Inline and external linkage Functions, storage classes. Object-Oriented Features of C++: Class and Objects, Data hiding & encapsulation, abstraction, constructors & destructors. Data Members and Member Functions, accessing class members, empty class, local class, global class, Scope Resolution Operator and its Uses, Static Data Members, Static Member Functions, Structure vs Class.

UNIT-IV

Object Initialization and Cleanup: Constructors, types of constructors, destructors, constant objects and constructors. Friend Function & Class: defining friend function and friend class, defining member function of a class as friend function.

Exception Handling in C++: exception handling model, exception handling constructs - try, throw, catch, Order of catch blocks, Catching all exceptions, Nested try blocks, handling uncaught exceptions, unexpected(), terminate() and standard exceptions.

UNIT-V (PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on C++ Language during the laboratory work.

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Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

- Herbert Scildt, C++, The Complete Reference, Tata McGraw-Hill
- Robert Lafore, Object Oriented Programming in C++, SAMS Publishing
- Bjarne Stroustrup, The C++ Programming Language, Pearson Education
- Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill.
- Richard Johnson, An Introduction to Object-Oriented Application Development, Thomson Learning.

B23-CSE-202 Introduction to Web Technologies

Max.Marks:100
Min.PassMarks:40

Internal Assessment Marks   :30[Theory(20) + Practical(10)]
External End TermExamMarks:70[Theory(50)+Practical(20)]

Time: Theory(3Hours),Practical(3Hours)   Credit:4

Course Objectives:
1. Learn the basics of web development.
2. Understand different types of web pages and web sites.
3. Implement HTML and CSS for web page designing.
4. Understand the design of web crawlers and search engines.
5. To implement the programs based on various concepts of web development.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I
Introduction to Internet and World Wide Web (WWW); Evolution and History of World Wide Web, Web Pages and Contents, Web Clients, Web Servers, Web Browsers; Hypertext Transfer Protocol, URLs; Searching, Search Engines and Search Tools. Web Publishing: Hosting website; Internet Service Provider; Planning and designing website; Web Graphics Design, Steps For Developing website

UNIT-II
Creating a Website and Introduction to Mark up Languages (HTML and DHTML), HTML Document Features& Fundamentals, HTML Elements, Creating Links; Headers; Text styles; Text Structuring; Text color and Background; Formatting text; Page layouts, Images; Ordered and Unordered lists; Inserting Graphics; Table Creation and Layouts; Frame Creation and Layouts; Working with Forms and Menus; Working with Radio Buttons; Check Boxes; Text Boxes, HTML5

UNIT-III
Introduction to CSS (Cascading Style Sheets): Features, Core Syntax, Types, Style Sheets and HTML, Style Rule Cascading and Inheritance, Text Properties, CSS Box Model, Normal Flow Box Layout, Positioning and other useful Style Properties; Features of CSS3.

UNIT-IV
The Nature of JavaScript: Evolution of Scripting Languages, JavaScript-Definition, Programming for Non-Programmers, Introduction to Client–Side Programming, Enhancing HTML Documents with JavaScript. Static and Dynamic web pages.

UNIT-V(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on HTML/CSS/JavaScript Language during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

B23-CSE-203 Concepts of Operating Systems

Max.Marks:100

Min.PassMarks:40

Internal Assessment Marks   :30[Theory(20) + Practical(10)]

External End TermExamMarks:70[Theory(50)+Practical(20)]

Time: Theory(3Hours),Practical(3Hours)

Credit:4

Course Objectives:

1. understand the basic concepts of operating systems and its services along with process management.
2. understand concept of process scheduling and acquire knowledge of process synchronization.
3. learn about memory management and virtual memory concepts.
4. learn to work with directory structure and security aspects.
5. To implement the programs based on operating system.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Introductory Concepts: Operating System, Functions and Characteristics, Historical Evolution of Operating Systems, Operating System Structure.

Types of Operating System: Real time, Multiprogramming, Multiprocessing, Batch processing.

Operating System Services, Operating System Interface, Service System Calls, System Programs. Process Management: Process Concepts, Operations on Processes, Process States and Process Control Block. Inter-Process Communication.

UNIT-II

CPU Scheduling: Scheduling Criteria, Levels of Scheduling, Scheduling Algorithms, Multiple Processor Scheduling, Algorithm Evaluation.

Synchronization: Critical Section Problem, Semaphores, Classical Problem of Synchronization, Monitors. Deadlocks: Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery.

UNIT-III

Memory Management Strategies: Memory Management of Single-User and Multiuser Operating System, Partitioning, Swapping, Contiguous Memory Allocation, Paging and Segmentation; Virtual Memory Management: Demand Paging, Page Replacement Algorithms, Thrashing.

UNIT-IV

Implementing File System: File System Structure, File System Implantation, file operations, Type of Files, Directory Implementation, Allocation Methods, and Free Space Management.

Disk Scheduling algorithm- SSTF, Scan, C- Scan, Look, C-Look. SSD Management.

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UNIT-V(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on Scheduling algorithms in C/C++ during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:
- Silberschatz A., Galvin P.B.,and Gagne G., Operating System Concepts, John Wiley &Sons.
- Godbole, A.S., Operating Systems, Tata McGraw-Hill Publishing Company, New Delhi.
- Deitel, H.M., Operating Systems, Addison- Wesley Publishing Company, New York.
- Tanenbaum, A.S., Operating System- Design and Implementation, Prentice Hall ofIndia, New Delhi.

B23-CSE-204 Digital Tools

Max.Marks:75

Min. Pass Marks:

Internal Assessment Marks :20[Theory(15) + Practical(05)]
External End TermExamMarks:55[Theory(35)+Practical(20)]

Credit:3

Time: Theory(3Hours),Practical(3Hours)

Course Objectives:
1. Understand the basic concepts of data, information and searching .
2. understand concept of TPS & MIS
3. learn about Ecommerce Models
4. learn Security threats

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE question sin all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Introduction to internet: concept, application and uses of Internet, Internet services, search engines
Information Technology and Business: concepts of data, information and information system, effects of IT on business

UNIT-II

Types of information system: Transaction Processing System (TPS), Management Information System (MIS).
Introduction to E-commerce; e-commerce and world wide web; e-commerce application services;

UNIT-III

Ecommerce models: B2B, B2C, C2C; electronic data interchange: benefits, components of EDI, EDI implementation.
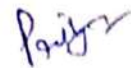
UNIT – IV

Security issues in e-commerce, M-commerce and e-governance, difference m-commerce and e-commerce

UNIT-V(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on Digital tools during the laboratory work.

The students should be able to work on Internet – communication through Internet. Research using online sources – surveys, research on social networking sites. Vlogs, Bhim, banking UPIs, Ayushman app.

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Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	4	2	A three hour exam for both Theory and Practicum
Seminar presentation/assignment/quiz/class test etc	4	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	3	
Mid-Term Exam	7	-	
Total	15	5	

Suggested Readings:

- Bajaj, Kamlesh K and Debjani Nag, E-commerce – The Cutting Edge of Business, Tata McGraw Hill (P) Ltd., New Delhi.
- Greenstein, Marilyn, and Todd M. Feinman, Electronic Commerce, Tata McGraw Hill, New Delhi.
- Leon, Alexis: Fundamental of Information Technology, Vikas Publication House (P) Ltd., New Delhi
- Minoli, Daniel, Internet and Intranet Engineering, Tata McGraw-Hill Publishing Co Ltd., New Delhi.
- Whitley, David, E-Commerce: Strategy, Technology and Applications, Tata McGraw-Hill Publishing Co Ltd., New Delhi.

DEPARTMENTOFCOMPUTERSCIENCEANDAPPLICATIONSS CHEME AND SYLLABUS OFEXAMINATION FOR
Bachelor(Honours/Honours with Research) of Computer Application
Duration 4Years(8Semesters)w.e.f.AcademicSession2023-24

Course Code	Course Title	Credit	L: T:P: CH	Internal Marks		External Marks		Total Marks	
				Th	Pr	Th	Pr	Min	Max
Major/Core Courses									
BCA23-CC201	Object Oriented Programming using C++	4	3 :0:1:5	20	10	50	20	40	100
BCA23-CC202	Introduction to Web Technologies	4	3 :0:1:5	20	10	50	20	40	100
BCA23-CC203	Concepts of Operating Systems	4	3 :0:1:5	20	10	50	20	40	100
Minor/Vocational Courses									
BCA23-M201	Advance Discrete Structures	2	1 :0:1:3	10	05	20	15	20	50
Multidisciplinary Courses									
BCA23-MDC201	Word Processing	3	2 :0:1:4	15	05	35	20	30	75
Ability Enhancement Courses									
	To be opted by students from the Central Pool	2	2 :0 :0:2	15	-	35	-	20	50
Skill Enhancement Courses									
	To be opted by students from the Central Pool	3	2 :0:1:4	15	05	35	20	30	75
Value Added Courses									
	To be opted by students from the Central Pool	2	2 :0 :0:2	15	-	35	-	20	50
	Total	24	30						600

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BCA23-CC201
Object Oriented Programming using C++

Max.Marks:100
Min.PassMarks:40

Internal Assessment Marks : 30[Theory(20)+Practical(10)]
External End TermExamMarks:70[Theory(50)+Practical(20)]

Time: Theory(3Hours),Practical(3Hours)   Credit:4

Course Objectives:

1. Learn the basics of C++program, data types and input/output statements.
2. Understand different types of operators, their hierarchies and also control statements of C++.
3. Implement programs using arrays and strings.
4. Get familiar with OOPS concepts in C++ language.
5. To implement the programs based on various concepts of C++.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Introduction to C++: About C++, Character Set, Keywords, Identifiers, Constants, Punctuators, Date Types: User-Defined, Built-in, Derived Data Types, Access Modifiers.
Unformatted and Formatted I/O Operations.I/O using extraction and extraction operators, Type Conversion, Type Casting .Operators in C++: Arithmetic, Relational, Logical, Bitwise, Ternary, Precedence & associativity of Operators.

UNIT-II

Control Structures: if statement, if-else statement, nested if, if-else-if ladder, switch...case statement, break and continue, goto statement, nested switch...case statement, Loops: while loop, do...while loop, for loop .Arrays and strings: Array definition, initialization multi dimensional arrays, Manipulation of array elements, String declaration and initialization, Manipulations, String handing functions.

UNIT-III

Functions: Declaration and Definition, return values, arguments, passing parameters by value, call by reference, call by pointer, Recursions, Inline and external linkage Functions, storage classes.Object-Oriented Features of C++: Class and Objects, Data hiding & encapsulation, abstraction, constructors &destructors .Data Members and Member Functions, accessing class members, empty class, local class, global class, Scope Resolution Operator and its Uses, Static Data Members, Static Member Functions, Structure vs Class.

UNIT-IV

Object Initialization and Cleanup: Constructors, types of constructors, destructors, constant objects and constructors. Friend Function & Class: defining friend function and friend class, defining member function of a class as friend function.
Exception Handling in C++: exception handling model, exception handling constructs - try, throw, catch, Order of catch blocks, Catching all exceptions, Nested try blocks, handling uncaught exceptions, unexpected(), terminate() and standard exceptions.

UNIT-V(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on C++ Language during the laboratory work.

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Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/ Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

- Herbert Scildt, C++, The Complete Reference, Tata McGraw-Hill
- Robert Lafore, Object Oriented Programming in C++, SAMS Publishing
- BjarneStroustrup, The C++ Programming Language, Pearson Education
- Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill.
- Richard Johnson, An Introduction to Object-Oriented Application Development, Thomson Learning.

BCA23-CC202

Introduction to Web Technologies

Max.Marks:100
Min.PassMarks:40

Internal Assessment Marks   :30[Theory(20) + Practical(10)]
External End TermExamMarks:70[Theory(50)+Practical(20)]

Time: Theory(3Hours),Practical(3Hours)   Credit:4

Course Objectives:

1. Learn the basics of web development.
2. Understand different types of web pages and web sites.
3. Implement HTML and CSS for web page designing.
4. Understand the design of web crawlers and search engines.
5. To implement the programs based on various concepts of web development.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Introduction to Internet and World Wide Web (WWW); Evolution and History of World Wide Web, Web Pages and Contents, Web Clients, Web Servers, Web Browsers; Hypertext Transfer Protocol, URLs; Searching, Search Engines and Search Tools. Web Publishing: Hosting website; Internet Service Provider; Planning and designing website; Web Graphics Design, Steps For Developing website

UNIT-II

Creating a Website and Introduction to Mark up Languages (HTML and DHTML), HTML Document Features& Fundamentals, HTML Elements, Creating Links; Headers; Text styles; Text Structuring; Text color and Background; Formatting text; Page layouts, Images; Ordered and Unordered lists; Inserting Graphics; Table Creation and Layouts; Frame Creation and Layouts; Working with Forms and Menus; Working with Radio Buttons; Check Boxes; Text Boxes, HTML5

UNIT-III

Introduction to CSS (Cascading Style Sheets): Features, Core Syntax, Types, Style Sheets and HTML, Style Rule Cascading and Inheritance, Text Properties, CSS Box Model, Normal Flow Box Layout, Positioning and other useful Style Properties; Features of CSS3.

UNIT-IV

The Nature of JavaScript: Evolution of Scripting Languages, JavaScript-Definition, Programming for Non-Programmers, Introduction to Client–Side Programming, Enhancing HTML Documents with JavaScript. Static and Dynamic web pages.

UNIT-V(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on HTML, CSS and Java Script during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:
- Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.
- Ramesh Bangia, Multimedia and Web Technology, Firewall Media.
- Thomas A. Powell, Web Design: The Complete Reference, Tata McGraw-Hill
- Wendy Willard, HTML Beginners Guide, Tata McGraw-Hill.
- Deitel and Goldberg, Internet and World Wide Web, How to Program, PHI
- David Flanagan, JavaScript: The Definitive Guide: The Definitive Guide.
- Kogent Learning, Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, AJAX – Black Book, Wiley IndiaPvt. Ltd.

BCA23-CC203
Concepts of Operating Systems

Max.Marks:100
Min.PassMarks:40

Internal Assessment Marks :30[Theory(20) + Practical(10)]
External End Term Exam Marks:70[Theory(50)+Practical(20)]

Time: Theory(3Hours),Practical(3Hours)   Credit:4

Course Objectives:

1. Understand the basic concepts of operating systems and its services along with process management.
2. Understand concept of process scheduling and acquire knowledge of process synchronization.
3. Learn about memory management and virtual memory concepts.
4. Learn to work with directory structure and security aspects.
5. To implement the programs based on operating system.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Introductory Concepts: Operating System, Functions and Characteristics, Historical Evolution of Operating Systems, Operating System Structure.

Types of Operating System: Real time, Multiprogramming, Multiprocessing, Batch processing.

Operating System Services, Operating System Interface, Service System Calls, System Programs. Process Management: Process Concepts, Operations on Processes, Process States and Process Control Block. Inter-Process Communication.

UNIT-II

CPU Scheduling: Scheduling Criteria, Levels of Scheduling, Scheduling Algorithms, Multiple Processor Scheduling, Algorithm Evaluation.

Synchronization: Critical Section Problem, Semaphores, Classical Problem of Synchronization, Monitors. Deadlocks: Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery.

UNIT-III

Memory Management Strategies: Memory Management of Single-User and Multiuser Operating System, Partitioning, Swapping, Contiguous Memory Allocation, Paging and Segmentation; Virtual Memory Management: Demand Paging, Page Replacement Algorithms, Thrashing.

UNIT-IV

Implementing File System: File System Structure, File System Implantation, file operations, Type of Files, Directory Implementation, Allocation Methods, and Free Space Management.

Disk Scheduling algorithm- SSTF, Scan, C- Scan, Look, C-Look.SSD Management.

DCSA, CRSU, Jind

UNIT-V(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies
execution based on Scheduling Algorithms, Memory Management and File System during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	Athree hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

- Silberschatz A., Galvin P.B.,and Gagne G., Operating System Concepts, John Wiley &Sons.
- Godbole, A.S., Operating Systems, Tata McGraw-Hill Publishing Company, New Delhi.
- Deitel, H.M., Operating Systems, Addison- Wesley Publishing Company, New York.
- Tanenbaum, A.S., Operating System- Design and Implementation, Prentice Hall of India, New Delhi.

BCA23-M201
Advanced Discrete Structures

Max.Marks:50
Min.PassMarks:20

Internal Assessment Marks :15[Theory(10)+Practical(05)]
External End Term Exam Marks: 35[Theory(20) +Practical(15)]

Time: Theory(3Hours),Practical(3Hours)   **Credit:2**

Course Objectives:
1. Understand the basic concepts of Theory of Programming Languages.
2. Understand concept of Lattices, Boolean Algebra.
3. Understand the basic concepts of Fuzzy Logic
4. Learn about applications of Boolean Algebra and Lattices..
5. Learn to work with Fuzzy Logic.
6. To implement the programs based on Lattice, Boolean Algebra and Fuzzy Logic.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus .Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hours duration.

UNIT-I
Programming Languages: Introduction to Programming Languages, Evolution of Programming Languages, Language Paradigms, Syntax and Semantics, Names Bindings and Scopes, Data Types, Expressions and Assignment Statements, Statement Level Control Structure, Strong and Weak Typing, Subprograms, Programs.

UNIT-II
Relations, Partial Ordered Relation, Well Ordered Relation, Hasse Diagram, Lattices, Lattice Points, 2-D Lattice, 3-D Lattice, Properties of Lattices, Distributive Lattice, Complemented Lattice, Symmetric Lattice, Asymmetric Lattice.

UNIT-III
Boolean Algebra: Lattices as Boolean Algebra, Boolean Laws, Boolean Theorems and proofs, Logic Gates, Logic Circuits, Switching Circuits.

UNIT-IV
Fuzzy Logic: Introduction to fuzzy Logic, Classical and Fuzzy Sets, Overview of Classical Sets, Membership Function, Fuzzy Rule generation. Operations on Fuzzy Sets: Compliment, Intersection, Union, Combination of Operations, Aggregation Operation.

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers

UNIT-V (PRACTICUM)

In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on Lattices, Boolean Algebra and Fuzzy Logic and Arithmetic during the laboratory work.

DCSA, CRSU, Jind

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	4	-	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	-	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	6	-	
Total	10.	5	

Suggested Reading

- Doris Appleby, Programming Languages: Paradigm and Practice, Mc-Graw Hill, 1991.
- Allen Doerr : Applied Discrete Structures, Open Textbook Library, 2021
- Rosen H : Discrete Mathematics and Its Applications, Mc-Graw Hill, 2017
- M. Ganesh , "Introduction to Fuzzy sets and Fuzzy Logic", PHI , 2006

BCA23-MDC201
Word Processing

Max.Marks: 75
Min.PassMarks: 30

Internal Assessment Marks   :20 [Theory(15) + Practical(05)]
External End Term Exam Marks :55 [Theory(35)+Practical(20)]

Time: Theory(3Hours),Practical(3Hours)

Credit:3

CourseObjectives:
1. To learn the basics of MS Word.
2. To understand various formatting options.
3. To familiarize the student with report writing.
4. To get familiar with concepts like table,mail merge.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and theremaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carryequal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have toattempt FIVEquestionsinall,selectingone questionfromeachunit. Examinationwillbe ofthree-hour duration.

Practicumwill beevaluatedbyanexternal andaninternalexaminer.Examinationwillbeofthree-hourduration.

UNIT-I
Introduction to Word Processing, Development of the Word Processor, Design considerations for word processed documents, Creating, opening and closing documents, working with multiple documents, Saving documents, Save an existing file under another name, Save different Versions

UNIT-II

Formatting Documents, Text Formatting, Paragraph Formatting, Text alignment, Tabs and its types, placing text at the tab position, Paragraph spacing, Working with lists, Paragraph borders and shading, Creating and Applying Styles

UNIT-III
Adding tables,Adding data to a table, Deleting a table, Add and delete columns and rows, Modifying columns and rows, Images, Inserting images, Modifying images, Resize an image and charts

UNIT-IV
Mail Merge, Preparing the documents, Creating the main document, Creating the data source, Document formatting
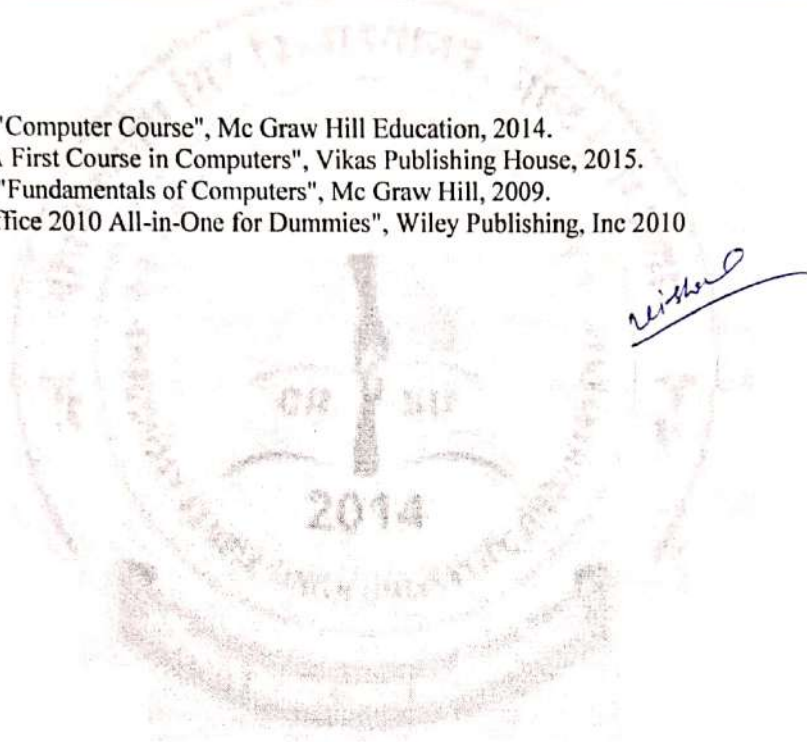
UNIT-V(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on MS Word during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	EndTermExamination:
ClassParticipation	4	2	Athree hourexam for bothTheoryandPracticum
Seminar/presentation/assignment/quiz/classtestetc	4	-	
Seminar/Demonstration/Viva-voce/Labrecordsetc.:	-	3	
Mid-TermExam	7	-	
Total	15	5	

SuggestedReadings:
1. Taxali , Ravi Kant, "Computer Course", Mc Graw Hill Education, 2014.
2. Saxena , Sanjay, "A First Course in Computers", Vikas Publishing House, 2015.
3. Balagurusami , E., "Fundamentals of Computers", Mc Graw Hill, 2009.
4. Weverka, Peter, "Office 2010 All-in-One for Dummies", Wiley Publishing, Inc 2010

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

Scheme and Syllabus of
Skill Enhancement Courses (SECs) for Central Pool for
2nd semester of NEP based Undergraduate Programmes
w.e.f. Academic Session 2023-24

Course Code	Course Title	Credit	L : T :P: CH	Internal Marks		External Marks		Total Marks	
				Th	Pr	Th	Pr	Min	Max
B23-SEC-201	Cloud Computing Skills	3	2 : 0 : 1 : 4	15	05	35	20	30	75
B23-SEC-226	Computer Programming in C++	3	2 : 0 : 1 : 4	15	05	35	20	30	75
B23-SEC-227	Programming in Python	3	2 : 0 : 1 : 4	15	05	35	20	30	75

B23-SEC-201 Cloud Computing Skills

Max. Marks: 75
Min. Pass Marks: 30

Internal Assessment Marks : 20 [Theory (15) + Practical (05)]
External End Term Exam Marks : 55 [Theory (35) + Practical (20)]

Time : Theory (3 Hours), Practical (3 Hours)   Credit: 3

Course Objectives:
1. To understand the concept of Clouding Computing.
2. To know about Seven Step Model of Migration into a Cloud.
3. To get familiar with Cloud Paradigms.
4. To know about Virtual Machine infrastructure and Security in Cloud.
5. To understand the Integration of Private and Public Cloud

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus.Candidate will have to attempt FIVE questions in all, selecting one question from each unit.Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Introduction to Cloud, Cloud Computing Reference Model, Distributed Systems, Virtualization, Web 2.0, Service Oriented Computing, Utility Oriented Computing, Parallel vs Distributed Computing.
Types of Cloud : Public, Private, Hybrid, Community. Economics of Cloud
Cloud Reference Model : Architecture, SAAS, PAAS, IAAS.

UNIT-II

Virtualization : Characteristics of Virtualization Environment, Taxonomy of Virtualization Techniques, Pros and Cons of Virtualization. Business and Consumer Applications of Cloud : CRM, ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming. Energy Efficient and Green Cloud Computing Architecture.

UNIT-III

Concurrent Computing : Programming Applications with Threads, Multithreading, Domain Decomposition, Functional Decomposition. Scientific Applications of Cloud : Healthcare, Protein Structure Prediction, Gene Expression Data Analysis, Satellite Image Processing.

UNIT-IV

Market Based Management of Cloud : Market Oriented Cloud Computing, Reference Model for Market Oriented Cloud Computing, Technologies and Initiative Supporting Market Oriented Cloud Computing, Observations.
Federal Cloud / Inter Cloud : Characterization and Definition, Cloud Federation Stack, Aspects of Interest, Technologies for Cloud Federations, Observations. Third Party Cloud Service.

UNIT-V (PRACTICUM)

In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	4	2	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	4	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	3	
Mid-Term Exam	7	-	
Total	15	5	

Suggested Readings:

1. RajkumarBuyya, Christian Vecchiola and S. ThamaraiSelvi, *"Mastering Cloud Computing"*, McGraw Hill Education, 2016.
2. Lizhe Wang, Rajiv Ranjan, Jinjun Chen and BaualemBenatallah, *"CludComputing : Methodology Systems and Applications"*, CRC Press, 2012.
3. Kris Jamsa, *"Cloud Computing"*, Jones and Bartlett Learning, 2013.
4. NayanRuparelia, *"Cloud Computing"*, MIT Press, 2015

B23-SEC-226 Computer Programming in C++-1

Max. Marks: 75
Min. Pass Marks: 30

Internal Assessment Marks : 20 [Theory (15) + Practical (05)]
External End Term Exam Marks : 55 [Theory (35) + Practical (20)]

Time : Theory (3 Hours), Practical (3 Hours)   Credit: 3

Course Objectives:

1. Learn the basics of C++program, datatypes and input/output statements.
2. Understand different types of operators, their hierarchies and also control statements of C++.
3. Implement programs using arrays and strings.
4. Get familiar with OOPS concepts in C++ language.
5. To implement the programs based on various concepts of C++.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Introduction to C++: About C++, Character Set, Keywords, Identifiers, Constants, Punctuators, Date Types: User-Defined, Built-in, Derived Data Types, Access Modifiers.
Unformatted and Formatted I/O Operations. I/O using extraction and extraction operators, Type Conversion, Type Casting. Operators in C++: Arithmetic, Relational, Logical, Bitwise, Ternary, Precedence & associativity of Operators.

UNIT-II

Conditional Control Structures: if statement, if-else statement, nested if, if-else-if ladder, switch...case statement, break and continue, goto statement, nested switch...case statement.

UNIT-III

Loops: while loop, do...while loop, for loop. Arrays and strings: Array definition, initialization multidimensional arrays, Manipulation of array elements, String declaration and initialization, Manipulations, String handing functions.

UNIT-IV

Functions: Declaration and Definition, return values, arguments, passing parameters by value, call by reference, call bypointer, Recursions, Inline and external linkage Functions.

UNIT-V(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on C++ Language during the laboratory work.

SuggestedEvaluationMethods:

InternalAssessment:	Theory	Practicum	End Term Examination:
Class Participation	4	2	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	4	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	3	
Mid-Term Exam	7	-	
Total	15	5	

Suggested Readings:

1. Herbert Scildt, C++, The Complete Reference, Tata McGraw-Hill
2. Robert Lafore, Object Oriented Programming in C++, SAMS Publishing
3. BjarneStroustrup, The C++ Programming Language, Pearson Education
4. Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill.
5. Richard Johnson, An Introduction to Object-Oriented Application Development, Thomson Learning.

B23-SEC-227 Programming in Python

Max. Marks: 75
Min. Pass Marks: 30

Internal Assessment Marks : 20 [Theory (15) + Practical (05)]
External End Term Exam Marks : 55 [Theory (35) + Practical (20)]

Time : Theory (3 Hours), Practical (3 Hours)

Credit: 3

Course Objectives:

1. To understand the basic concepts of Python
2. To learn the syntax and semantics of Python Programming Language.
3. To Illustrate the process of structuring the data using lists, tuples and dictionaries.
4. To write Python functions to facilitate code reuse and manipulate strings.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus.Candidate will have to attempt FIVE questions in all, selecting one question from each unit.Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Keywords and Identifiers; Comments: Purpose/use of comments, Single line comment/Multiline comment; Python Variables: Declaration of Variables, Assign Values to Variables, Initialization, Reading, Variable. naming restrictions, and Types of Python Variables.
Python Data Types: Implicit Declaration of Data Types, Python Numbers (Integers, floating-point numbers, and complex numbers), Python Strings, Python Boolean data type;

UNIT-II

Operators: Arithmetic, Comparison/Relational Operators, Increment Operators, Logical operators, Identity Operators, and Operators Precedence.
Python Control Flow Statement, Decision Making: Simple If Structure, if-else structure, if elif structure, and nested If Structure;

UNIT-III

Looping: Python Loop Statements. Python while loop, Python for loop, Python range(), Python Nested Loop Structures, and Inserting conditions in Loops and vice versa; Python Branching Statements – break, continue, pass.
Python Lists: Create Python Lists, Update Python Lists, Delete Elements from Python Lists, and Built-in Functions Methods for Python Lists.

UNIT-IV

Tuples: create, update, join and methods; Sets: create, add/remove items, join sets, set methods;
Dictionary: create, access, add/remove items, dictionary methods.
Manipulating
Strings - Working with Strings, Useful String Methods

DCSA, CRSU, Jind

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Python Functions: defining function, arbitrary arguments, keywords arguments, default parameter values, return value and return statements; Lambda; Arrays: looping through array elements, array methods;

UNIT-V (PRACTICUM)

In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies based on Python during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	4	2	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	4	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	3	
Mid-Term Exam	7	-	
Total	15	5	

Suggested Readings:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015, ISBN: 978-9352134755.
2. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, WileyIndiaPvt Ltd. ISBN-13: 978-8126556014.
3. Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson EducationIndia, 2015. ISBN-13: 978-9332555365.
4. ReemaThareja, "Python Programming using problem solving approach", OxfordUniversity press, 2017. ISBN-13: 978-0199480173
5. Charles R. Severance, "Python for Everybody: Exploring Data Using Python 3", 1st Edition, Shroff Publishers, 2017. ISBN: 978-9352136278

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