Siddharth University, Kapilvastu, Siddharthnagar

Syllabus
of
Computer Application
As Major for
B.Sc./B.A. Programme
in
Choice Based Credit System (CBCS)
based on
National Education Policy-2020
[Revised vide Academic Council on 25.07.2023]

(Common Minimum Syllabus for all U.P. State Universities and Colleges)
2021

Year wise structure of B.Sc./B.A. Computer Application Syllabus

This course shall be offered in B.Sc./B.A. programme as a major subject along with two other major subjects and combinations available for the students of B.Sc./B.A. programmes. Computer Application shall be one major subject along with other two major subjects which may be opted by the students as per the combinations offered by the University /College under CBCS.

Year	Semester	Course Code	Paper Title	Theory/ Practical	Credits
I	I	B0CA101T	Computer Fundamentals and IT Tools	Theory	4
		B0CA102P	Lab Based on Office Tools	Practical	2
	II	B0CA201T	Problem Solving using C Programming	Theory	4
		B0CA202P	Lab Based on C Programming	Practical	2
II	III	B0CA301T	Python and R Programming	Theory	4
		B0CA302P	Lab Based on Python and R	Practical	2
	IV	B0CA401T	Data base Management System and SQL	Theory	4
		B0CA402P	Lab Based on DBMS	Practical	2
III	V	B0CA501T	Object Oriented Programming Using C++	Theory	4
		B0CA503P	Lab on C++ programming based on Course code B0CA501T	Practical	2
		B0CA502T	System Analysis and Design	Theory	4
		B0CA504P	Viva-voce Examination conducted by external examiner at the end of the Session based on Course code B0CA502T	Practical	2
	VI	B0CA601T	Internet and Web Technology	Theory	4
		B0CA603P	Lab on Web Technology based on Course code B0CA601T	Practical	2
		B0CA602T	Cyber Forensics and Cyber Laws	Theory	4
		B0CA604P	Viva-voce Examination conducted by external examiner at the end of the Session based on Course code B0CA602T	Practical	2

Syllabus Developed by:

S.No.	Name	Designation	Department	College/ University
1	Dr. Ashwini Kumar Srivastava	Asst. Professor & Head	Dept. of Computer Application	Shivharsh Kisan P.G. College, Basti

Year wise Structure of B.Sc./B.A. for subject Computer Application

Type of Award	Year	Sem.	Paper-I Theory	Credit	Paper-II Theory	Credit	Paper-III Practical	Credit	Paper-IV Practical	Credit	Total Credits of the Subject
Certificate in Computer Application	1	I	Computer Fundamentals and IT Tools	4	NIL	0	Lab Based on Office Tools	2	NIL	0	6
		II	Problem Solving using C Programming	4	NIL	0	Lab Based on C Programming	2	NIL	0	6
Diploma in Computer Application	2	III	Python and R Programming	4	NIL	0	Lab Based on Python and R	2	NIL	0	6
		IV	Data base Management System and SQL	4	NIL	0	Lab Based on DBMS	2	NIL	0	6
Bachelor of Science	3	V	Object Oriented Programming Using C++	4	System Analysis and Design	4	Lab on C++ programming based on Course code B0CA501T	2	Viva-voce Examination conducted by external examiner at the end of the Session based on Course code B0CA502T	2	12
		VI	Internet and Web Technology	4	Cyber Forensics and Cyber Laws	4	Lab on Web Technology based on Course code B0CA601T	2	Viva-voce Examination conducted by external examiner at the end of the Session based on Course code B0CA602T	2	12
									Total Credits=		48

Syllabus for B.Sc./B.A. : Subject: Computer Application

Programme/Class: Certificate	Year: First	Semester: First
Subject: Computer Application		
Course Code: B0CA101T	**Course Title: Computer Fundamentals and IT Tools**	

Course outcomes:

CO 1: Understand hardware components of computer system such as memory system organization, input/output devices, aware of software components of computer system, and windows operating system concepts.

CO 2: Develops basic understanding of computers and its applications.

CO3: Develops the ability to work with computers using various networks/Internet.

CO4: Makes proficient in using various application software to solve real-world problems.

CO5: Introduces the more advanced features of the IT.

Credits: **4**	**Core Compulsory**
Max. Marks: **25+50**	Min. Passing Marks: As per UGC/University CBCS norm As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **4-0-0**		
Unit	**Topic**	**No. of Lectures**
I	Computer and its characteristics, applications of computer, digital and analog computer, Generation of computer, Computer Types: Mainframe computer, Super computer, Mini Computer. Memory: memory hierarchy, memory types, Units of Measurement of Storage. Hard disk drives, Floppy disk, Magnetic Tapes, Optical Disks: CD, DVD, input and output devices: Keyboard, Mouse, Joystick, scanner, OCR, OMR, web camera, monitor, printer and its types.	**8**
II	Software and its types (System Software, Application Software, firmware Software's) Computer Languages and its types (Machine Language, Assembly Language, High Level Language: Merits and demerits of computer languages), Translators: Compiler, Linker, Interpreter, Loader	**7**
III	Number System: Decimal, Binary, Octal, Hexadecimal, Conversion of one number system to another, Arithmetic Operations: Addition, Subtraction, Multiplication. Complement methods: r's and (r - l)'s complement, Fixed point & floating point representation of numbers.	**8**
IV	Introduction to Computer Network, Data Communication, Components of Data Communication, Data Transmission Mode, LAN, MAN, WAN , LAN Topologies: Ring, Bus, Star, Mesh and Tree Topologies, Internet, Intranet, IP Address, DNS, Web page, Website, Browsers, URL, e-mail, Applications of Internet.	**7**
V	Operating System and its types, Functions of Operating System, Window s Operating System and its features, Desktop elements: Icons, My Computer, Recycle Bin, Taskbar, Network Places, Documents, Anatomy of window: title bar, menu bar, tool bar, control buttons, scroll bars, document area and stat us bar. Control panel, disk formatting, defragmentation, Disk Clean-Up, magnifier, Narrator, On-Screen Keyboard	**7**

VI	Introduction to Word Processing, Microsoft word screen, file menu, edit menu, view menu, insert menu, format menu, tools menu table menu, alignment of text, applying fonts, working with wizards, size of text, font of the text, color of the text, autocorrect, auto format, working with tables, mail-merge feature, header footers and page numbers, using bulleted and number lists, inserting a picture file, inserting a clip art, inserting auto shapes, inserting word art, inserting a drawing.	**8**
VII	Understanding Microsoft Excel for windows, understanding spreadsheets, file menu, edit menu, view menu, insert menu, format menu, tools menu, data menu, creating a Worksheet in Excel for windows, copying formula, formulas that make decisions, functions in Excel, sum function, average function, function wizard, functions in Excel, Date and time functions, logical functions, creating charts in Excel, creating graphs, modifying chart, adding data to a chart	**8**
VIII	Introduction of PowerPoint for windows, file menu, edit menu, view menu, insert menu, format menu, tools menu, slide show menu, creating presentation by AutoContent Wizard, creating a new presentation entering the text, moving the text, reordering slides, duplicating slides, deleting slides, making slide shows, adding effects, adding animation, creating your own animation.	**7**

Suggested Readings:

1. P. K. Sinha & Priti Sinha , "Computer Fundamentals", BPB Publications, 2007.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. Peter Norton, " Introduction to computers", Sixth Edition Tata McGraw Hill , 2007.
4. Joyce Coax, Joan Preppernau, Steve Lambert and Curtis Frye, "2007 Microsoft® Office System step by step", Microsoft Press, 2008.
5. R. K. Taxali, "PC Software for Windows", Tata McGraw Hill Publishers Pvt. Ltd.
6. V. Rajaraman, "Fundamentals of Computers", PHI.
7. Introduction to Information Technology, ITL Education Solution Ltd., Pearson Education India , 2012

Suggestive digital platforms web links:

1. https://www.pearsoned.co.in/prc/book/anita-goel-computer-fundamentals-1e-1/9788131733097
2. http://fmis.ap.gov.in/fileBkp2/13/computer_fundamentals%20by%20sinha%20&%20sinha.pdf

Programme/Class: Certificate	Year: First	Semester: First
Subject: Computer Application		
Course Code: B0CA102P	Course Title: Lab Based on Office Tools	

Course outcomes:

CO 1: To learn and understand handling of computer.

CO 2: To learn and understand Windows environment and its characteristics.

CO 3: Students should be made familiar with text processing, tabulation, mathematical and logical operations on data, chart creation.

CO 4: To learn and know about office tools(MS-Office)

CO 5: Develops the ability to work with Internet.

Credits: **2**	**Core Compulsory**
Max. Marks: **25**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **0-0-4**

Suggested Readings:

1. P. K. Sinha & Priti Sinha , "Computer Fundamentals", BPB Publications, 2007.
2. Peter Norton, " Introduction to computers", Sixth Edition Tata McGraw Hill , 2007.
3. Joyce Coax, Joan Preppernau, Steve Lambert and Curtis Frye, "2007 Microsoft® Office System step by step", Microsoft Press, 2008.
4. R. K. Taxali, "PC Software for Windows", Tata McGraw Hill Publishers Pvt. Ltd.
5. V. Rajaraman, "Fundamentals of Computers", PHI.
6. Introduction to Information Technology, ITL Education Solution Ltd., Pearson Education India , 2012

Suggestive digital platforms web links:

1. http://fmis.ap.gov.in/fileBkp2/13/computer_fundamentals%20by%20sinha%20&%20sinha.pdf

2. https://www.pearsoned.co.in/prc/book/anita-goel-computer-fundamentals-1e-1/9788131733097

In this course the students shall be exposed to various practical problems based on the Windows environment, Office tools using document preparation, spreadsheet, presentation (ppt) handling packages, uses of internet, web browsers, email, etc. and the Teacher-in-Charge shall design 15-20 problems. The students shall be required to systematically work out the solution of those problems and implement in the computer laboratory.

Programme/Class: Certificate	Year: First	Semester: Second

Subject: Computer Application

Course Code: B0CA201T	Course Title: Problem Solving using C Programming

Course outcomes:

CO 1: Appreciate and understand the working of a digital computer.

CO 2: Analyze a given problem and develop an algorithm to solve the problem.

CO3: Improve upon a solution to a problem.

CO4: Use the 'C' language constructs in the right way.

CO5: Design, develop and test programs written in C Language.

Credits: **4**	Core Compulsory
Max. Marks: **25+50**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **4-0-0**

Unit	Topic	No. of Lectures
I	Computer Based Problem Solving: Introduction, Characteristics of a Good Program, Procedure for Problem Solving, Algorithm: Algorithm and its characteristics, Algorithm Development, Advantages of Algorithms, Flow Chart: Symbols used in Flow-Charts, Advantages and Limitations of Flowcharts, History of C language, Structure of C program, compiling and running a C program, Errors: syntax, run time, linker and logical errors, C-Preprocessor, Header, File inclusion.	8
II	Character Set, Keywords and Identifiers, Constants, Data Types, Variables, qualifiers, Format of C program, Arithmetic , Relational and Logical Operators, Assignment Operators, Increment and Decrement Operators, Operator Precedence and Associativity.	7
III	Formatted Input and Output function, escape sequences, Simple if Statement, if... else Statement, Nesting of if... else Statements, Switch Statement, Conditional Operator, goto Statement, loops: for, while and do- while loops, break and continue statement.	8
IV	Functions: Introduction, using functions , Function declaration, prototype, Function definition , function call , return statement, Passing parameters, Scope of variables , Storage Classes , Recursive Functions	7
V	Arrays: Introduction, Declaration of Arrays, Accessing elements of the Array, Storing Values in Array, Calculating the length of the Array, Types of Arrays: one dimensional array, two dimensional Arrays, Strings: Introduction, String Operations, String and Character functions. Functions using Manipulation of String	8
VI	Pointers: Understanding Computer Memory, Introduction to Pointers, declaring Pointer Variables, Passing Arguments to	7

	Functions using Pointer, Pointer and Arrays, Passing Array to Function, Dynamic Memory Allocation	
VII	Structures in C: Introduction, Defining a Structure, Declaring Structure Variables, Array with Structures, Structures within Structures, Structure contains Pointers, Self Referential Structures, User Defined Data Types, typedef vs #define, 8 Enumerated Data Types, Difference between enum and typedef Statement, Union	7
VIII	File Handling in C: Introduction, Type of Files, Working with Files, File Operations, Functions for Getting Data by Traversing in the File : fseek(), ftell(), rewind(), Using Command Line Argument in File.	8

Suggested Readings:

1. Byron Gottfried, "Programming with C", Forth Edition, Tata McGraw Hill, 2018.
2. B.W. Kemighan & D.M. Ritchie," The C Programming Language," Second Edition, 2015, Prentice Halll of India
3. Yashavant kanetkar "Let us C", 16th Edition, BPB Publication, 2018
4. Ashwini Kr Srivastava, "A Textbook of C Programming with Computer's Basics", Neelkamal Parakshan, 2018
5. E. Balaguruswami, "Programming with ANSI-C" Forth Edition,2008, Tata McGraw Hill.

Suggestive digital platforms web links:

1. https://www.google.co.in/books/edition/Let_us_C_16th_Edition/QIV8DwAAQBAJ?hl=en&gbpv=1&dq=3.%09Yashwant+kanitakar+lat+us+c&printsec=frontcover

Programme/Class: Certificate		Year: First	Semester: Second
Subject: Computer Application			
Course Code: B0CA202P	Course Title: Lab Based on C Programming		

Course outcomes:

CO 1: To learn how to solve common types of computing problems.

CO 2: To learn and understand data types and control structures of C.

CO 3: solve mathematical problems by using programming features of C.

CO 4: Learn to write good portable C programs.

Credits: **2**	**Core Compulsory**
Max. Marks: **25**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **0-0-4**

Suggested Readings:
1. Yashavant kanetkar "Let us C", 16th Edition, BPB Publication, 2018
2. Ashwini Kr Srivastava, "A Textbook of C Programming with Computer's Basics", Neelkamal Parakshan, 2018.
3. Byron Gottfried, "Programming with C", Forth Edition, Tata McGraw Hill, 2018.

Suggestive digital platforms web links:
1. https://www.pearsoned.co.in/prc/book/anita-goel-computer-fundamentals-1e-1/9788131733097

List of Experiments:
1. Write a program in C to find area of a circle.
2. Write a program in C to calculate the expression: ((a*b)/c)+(a+b-c).
3. Write a program in C for conversion of Temperature from Celsius to Fahrenheit.
4. Write a program in C for checking given year is Leap-year or not.
5. Write a program in C for finding greatest number between given any three numbers.
6. Write a Program in C to display Monday to Sunday by first letter press through keyboard using switch & case statement.
7. Write a program in C for generating Fibonacci Series up to 10 terms using for loop.
8. Write a program in C for finding Factorial of any positive integer using while loop.
9. Write a program in C for generating ODD Numbers from 1 to 100 using do-while loop.
10. Write a program in C to check whether the given number is Prime or Not.
11. Write a program in C to find average marks obtained by a batch of the 10 student's in a test using 'single – dimensional array'.
12. Write a program in C for Find Transpose of a Matrix using 'multi–dimensional array'.
13. Write a program in C for addition of two matrices using 'multi–dimensional array'.
14. Write a program in C for multiplication of two matrices using 'multi–dimensional array'.
15. Write a program to for multiplication of two given positive integer using function.
16. Write a program in C for finding Factorial of any positive integer using 'recursion'.
17. Write a program in C to find sum of given any n integers using malloc( ) and free() function.
18. Write a program in C for concatenation of two strings using strcat() function.
19. Write program in C for finding length of any string.
20. Write program in C to read and print employee's record using structure.

Programme/Class: Diploma		Year: Second	Semester: Third
Subject: Computer Application			
Course Code: B0CA301T		**Course Title: Python and R Programming**	

Course outcomes:

CO 1: Develops the use of the Python and R Programming language to implement various algorithms, and develops the basic concepts and terminology of programming in general.

CO 2: Make familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc.

CO3: Able to apply the problem solving skills for creating, debugging and testing a software application using the Python and R Programming language.

CO4: Introduces the more advanced features of the Python and R Language.

Credits: **4**	**Core Compulsory**
Max. Marks: **25+50**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **4-0-0**		
Unit	**Topic**	**No. of Lectures**
I	Introduction to Python Programming: History, features, Installing Python, Running Python programe, Debugging: Syntax Errors, Runtime Errors, Semantic Errors, Experimental Debugging, Formal and Natural Languages, The Difference Between Brackets, Braces and Parentheses, Python Interpreter, Python shell, Indentation. Atoms, Identifiers , Basic Data Types such as numbers, strings, etc.	8
II	Variables and Expressions: Values and Types, Variables, Variable Names and Keywords, Type conversion, Operators and Operands, Expressions, Interactive Mode and Script Mode, Order of Operations. Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).	8
III	Creating Python Programs: Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions, Standard Libraries.	7
IV	Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, The while statement, Tables, Two-dimensional tables	7
V	Introduction to R, Data types in R: numeric/character/logical; real/integer, creation of new variables, vectors, matrices, accessing elements of a vector or matrix, import and export of files.	7
VI	Operators (Arithmetic operator, Relational operator, Logical, Assignment etc.), Control constructs: if command, if else command, for loop, repeat loop, while loop, Introduction to function in R	8
VII	Vector matrix operations: matrix operations such as addition,	7

	subtraction, multiplication, matrix inverse, solution of linear equation.	
VIII	Graphics in R: the plot command, simple mathematical function plots, histogram, bar-plot, points, lines, segments, arrows, pie diagram, graphical parameters, adding a legend, Insertion sorting. Basic statistics using R: measures of central tendency and dispersion, correlation, regression	**8**

Suggested Readings:

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Allen Downey, Jeffrey Elkner, Chris Meyers. How to think like a computer scientist: learning with Python / 1st Edition, 2012.
3. Ch Satynarayana, M Radhika Mani, ands B N Jagadeesh, Python Programming, Universities Press, 2018
4. Albert, J. & Rizzo, M.: R by Example, Springer, 2012
5. Michael J. Crawley: The R Book, 2nd Edition, Wiley, 2012

Suggestive digital platforms web links:

1. http://docs.python.org/3/tutorial/index.html
2. http://interactivepython.org/courselib/static/pythonds
3. https://www.r-project.org

Programme/Class: Diploma	Year: Second	Semester: Third
Subject: Computer Application		
Course Code: B0CA302P	Course Title: Lab Based on Python and R	

Course outcomes:

CO 1: To learn and understand Python and R Programming basics.

CO 2: To learn and understand various python statements and string manipulations.

CO3: To learn and understand the concepts of GUI controls and designing GUI applications.

CO4: To learn and know the concepts of file handling, exception handling and database connectivity

Credits: **2**	Core Compulsory
Max. Marks: **25**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **0-0-4**

Suggested Readings:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016
2. (http://greenteapress.com/wp/thinkpython/)
3. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
4. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
5. John V Guttag, "Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013
6. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
7. Albert, J. & Rizzo, M.: R by Example, Springer, 2012
8. Michael J. Crawley: The R Book, 2nd Edition, Wiley, 2012

Suggestive digital platforms web links:

1. https://www.pearsoned.co.in/prc/book/anita-goel-computer-fundamentals-1e-1/9788131733097
2. http://docs.python.org/3/tutorial/index.html
3. http://interactivepython.org/courselib/static/pythonds
4. http://www.ibiblio.org/g2swap/byteofpython/read/
5. https://www.r-project.org

List of Experiments:

1. Write a program in Python to find area of a rectangle.
2. Write a program in Python to find compound interest.
3. Write a program in Python for conversion of Temperature from Fahrenheit to Celsius.
4. Write a program in Python for checking given year is Leap-year or not.
5. Write a program in Python for finding greatest number between given any three numbers.
6. Write a program in Python for checking the given number is even or odd.
7. Write a function in Python that takes an integer input and calculates the factorial of that

number.
8. Write a program in Python to check whether the given number is Prime or Not.
9. Write a recursive function in Python to print the factorial for a given number.
10. Write a program in Python to calculate the sum and product of two compatible matrices.
11. Write a program in Python to read n integers and display them as a histogram.
12. Write a program in Python to display sine, cosine, polynomial and exponential curves.
13. Application of R software
    a). For the computation of matrix addition, subtraction, multiplication, inverse, determinant, etc.
    b). Plotting of mathematical functions
    c). Histogram, bar chart and pie chart
    d). Measures of central tendency
    e). Measures of dispersion
    f). Correlation and regression

Programme/Class: Diploma		Year: Second	Semester: Forth
Subject: Computer Application			
Course Code: B0CA401T		**Course Title: Data base Management System**	
Course outcomes: CO 1: Understands the basic perception of Data Base Management System. CO 2: Design E-R diagrams for real world applications. CO 3: Creating relational algebraic expressions using relational data models and languages. CO 4: Apply normalization transaction properties and concurrency control to design database. CO 5: Makes proficient in using SQL software to solve real-world problems.			
Credits: **4**		Core Compulsory	
Max. Marks: **25+50**		Min. Passing Marks: As per UGC/University CBCS norm	
Total No. of Lectures-Tutorials-Practical (in hours per week): **4-0-0**			

Unit	Topic	No. of Lectures
I	**Introduction:** Database System Concepts, File system vs. database system, Advantages and disadvantages of Database Systems, Database system architecture, DBA and its role.	7
II	**Data Models:** Data models and their types, Data base schema and instances, Data independence, Database Languages and Interfaces.	8
III	**Data Modeling Concepts:** ER model concepts: Notations for ER diagram, Extended E-R diagram, Extended E-R model, E-R model design issues, constraints, and keys: Weak entity set strong entity set, Relationships of higher degree.	7
IV	**Relational model concepts:** CODD's rules, constraints, keys, Concepts of Super Key, candidate key, primary key, foreign key Relational Algebra operations, Extended relational algebra operations, Relational Calculus, Tuple and Domain relational calculus.	8
V	**Database Design:** Functional dependencies, Normal forms, First, second, and third normal forms, BCNF, Multi-valued dependencies and Fourth Normal form, Join Dependencies and Fifth Normal form.	7
VI	**Introduction to SQL:** Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands: (SELECT - - - FROM - - - WHERE - - - GROUP BY - - - HAVING - - - ORDER BY), INSERT, DELETE, UPDATE, VIEW, Nested Queries.	8
VII	**Backup and Recovery:** Database backups. Why plan backups? Hardware protection and redundancy. Transaction logs. Importance of backups. Database recovery.	7
VIII	**Database Security and Integrity:** Types of Integrity constraints. Restrictions on integrity constraints. Data security risks, Data security requirements. Protecting data within the database. Granting and revoking key privileges and roles. Authenticating users to the database.	8

Suggested Readings:

1. Bipin Desai, " An Introduction to Database Systems", Galgotia Publications Pvt. Ltd.
2. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, "Database System Concept", McGraw - Hill, 7th Edition, 2020.
3. R. Elmasri, S.B. Navathe, Database Systems Models, Languages, Design and application Programming, 6 Edition, Pearson Education,2013.
4. C.J. Date, "An Introduction to Database Systems", Pearson, 8th edition, 2003
5. P. Rob, C. Coronel, Database System Concepts by, Cengage Learning India, 2008
6. MySQL : Reference Manual
7. Bayross, Ivan, "SQL, PL/SQL: The programming language of Oracle ", BPB publications, 2009.
8. Scott Urman, Ron Hardman and Michael McLaughlin, "Oracle Database l0g PL/SQL Programming", Tata McGraw-Hill, 8th Edition, 2008.

Suggestive digital platforms web links:

1. https://lc.fie.umich.mx/~rodrigo/BD/An%20Introduction%20to%20Database%20Systems%208e%20By%20C%20J%20Date.pdf
2. https://pdfweek.com/downloads/sql%20by%20ivan%20bayross%20pdf?__cf_chl_managed_tk__=pmd_03WFyJJQxlWrqSFqeaQ697O.dPXToGgF5UNCgUZ_xpg-1629642422-0-gqNtZGzNAuWjcnBszQh9
3. https://dev.mysql.com/doc/refman/8.0/en/

Programme/Class: Diploma	Year: Second	Semester: Forth
Subject: Computer Application		
Course Code: B0CA402P	Course Title: Lab Based on DBMS	

Course outcomes:

CO 1: Understand, analyze and apply common SQL statements including DDL, DML and DCL statements to perform different operations.

CO 2: To learn and understand DBMS environment and its characteristics.

CO 3: To learn and know about SQL

CO 4: Develops the ability to work with database.

Credits: **2**	Core Compulsory
Max. Marks: **25**	Min. Passing Marks: As per UGC/University CBCS norm
Total No. of Lectures-Tutorials-Practical (in hours per week): **0-0-4**	

Suggested Readings:

1. Paul DuBois, "MySQL Cookbook: Solutions for Database Developers and Administrators," Third Edition, O'Reilly Media, 2014.
2. Frank M. Kromann, "Beginning PHP and MySQL: From Novice to Professional," Fifth Edition, Apress, 2018.
3. Joel Murach and Ray Harris, "Murach's PHP and MySQL," First Edition, Mike Murach & Associates, 2010.
4. Luke Welling, Laura Thomson, "PHP and MySQL Web Development," Fourth Edition, Addison-Wesley, 2008.

Suggestive digital platforms web links:

1. https://www.oracle.com/in/database/technologies/appdev/plsql.html
2. https://dev.mysql.com/doc/refman/8.0/en/
3. http://www.luciopanasci.it/Ebooks/MySQL%20Cookbook,%203rd%20Edition.pdf

In this course the students shall be exposed to various practical problems based on the DBMS & SQL environment and the Teacher-in-Charge shall design 15-20 problems. The students shall be required to systematically work out the solution of those problems and implement in the computer laboratory.

Programme/Class: Bachelor in Science	Year: Third	Semester: Fifth
Subject: Computer Application		
Course Code: B0CA501T	**Course Title: Object Oriented Programming Using C++**	

Course outcomes:

CO 1: Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.

CO 2: Demonstrate the use of various OOPs concepts with the help of programs.

CO3: Understand dynamic memory management techniques using constructors, destructors, etc.

CO4: Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.

CO5: Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.

Credits: **4**	**Core Compulsory**
Max. Marks: **25+50**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **4-0-0**		
Unit	**Topic**	**No. of Lectures**
I	**Principles of Object Oriented Programming (OOP):** Basic Concepts of OOP, Comparison of procedural programming and OOP, Advantages of OOP, OOP Languages, Definitions: .Class, Objects, Concepts of inheritance and encapsulation, Operator overloading, Dynamic binding. Over view of OOP using C++, Basic Program construction: main and functions, Program statements, class declaration, comments++ compilation.	8
II	**Elements of C++ Language:** Tokens and identifiers: Character set and symbols, Keywords. C++, identifiers. Variables and constants: Integers & characters, Constants and symbolic constants, Dynamic initialization of variables, Reference variables, Enumerated variables, Data Types: Basic data types, Arrays and strings, User defined data types; Operators: Arithmetic, relational operators and operator precedence, Logical operators, Manipulators, type conversions and type cast operators, Console I/O : cin, cout functions, Control statements: The if statement, if else; else.... if: switch statements, Loops: for and while do statements, Break, continue, go to.	7
III	**Functions:** Simple functions: Declaration of functions. Calling functions, Function definition, Passing arguments and returning values: Passing constants and variables, Pass by value. Return statement, types of functions, Passing and returning structure variables: Reference variables and arguments: Overloaded functions, Inline functions, Default arguments, returning by reference.	8
IV	**Classes and Objects:** Declaration of classes and objects in C++, Class definition. Declaration of members, objects as date time, Objects as function arguments. Array of objects, Returning objects from function, Structures and classes.	7

V	**Constructors and Destructors:** Basic constructors, Parameterized constructors. Constructors with default arguments. Dynamic initialization of objects, use of copy constructor, shallow copying and deep copying, Dynamic constructors. Destructors, constraints on constructors and destructors.	7
VI	**Operator Overloading:** Overloading unary operators: Operator keyword, Arguments and return values, Laminations of increment operators, overloading binary operators. Arithmetic operators Examples: Addition of polar coordinates and concatenation of strings Multiple overloading, Comparison" operators, Arithmetic assignment operators. Data and type conversions: Conversion between basic types, Conversion between objects and basic types, conversion between objects of different classes, Constraints on type conversion.	8
VII	**Derived Classes and Inheritance:** Derived, classes and base class: Defining a derived class, accessing the bases class members, the protected access specifier. Derived class constructors. Overriding the member functions, Class hierarchies: Abstract base class. Constructors and member functions, Inheritance: Public and private inheritance, Access combinations and usage of access specifiers, Classes and structures. Multiple inheritance: Member functions in multiple, inheritance, constructors in multiple inheritance, Ambiguity in multiple inheritance.	8
VIII	**Exception Handling:** Use of exception handling, Try block, Catch handler, Throw statement, Exception specification.	7

Suggested Readings:

1. Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia Publication 1994.
2. E. Balagurusamy,"Object Oriented Programming with C++", TMH Publication.
3. B. Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.
4. Ira Pohl, "Object Oriented Programming using C++", Pearson Education, Second Edition Reprint
5. B. Stroustrup, "The C++ Programming language", Third edition, Pearson Education, 2004.
6. J. Rumbaugh, "Object Oriented Modeling and Design", Prentice Hall
7. Booch, Maksimchuk, Engle, Young, Conallen and Houstan, "Object Oriented Analysis and Design with Applications", Pearson Education.
8. S. B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", Fourth Edition, Pearson Education 2005.
9. Timthy Budd, "An Introduction to Object Oriented Programming with C++," Addition-Wesley.
10. Kip R. Irvine," C++ and Object-Oriented Programming," Prentice Hall.

Suggestive digital platforms web links:

1. http://www.lmpt.univ-tours.fr/~volkov/C++.pdf
2. https://www.certiology.com/tutorials/c-plus-plus-tutorial.html

Programme/Class: Bachelor in Science		Year: Third	Semester: Fifth
Subject: Computer Application			
Course Code: B0CA502T		**Course Title: System Analysis and Design**	

Course outcomes:

CO 1: An understanding of the analysis and development techniques required as a team member of a medium-scale information systems development project.

CO 2: An understanding of the ways in which an analyst's interaction with system sponsors and users play a part in information systems development

CO 3: Makes experience in developing information systems models.

CO 4: Makes experience in developing systems project documentation.

Credits: **4**	**Core Compulsory**
Max. Marks: **25+50**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **4-0-0**

Unit	Topic	No. of Lectures
I	**Basic Concept of Systems:** The System: Definition and Concepts; Elements of a System: Input, Output Processor, Control, Feedback, Environment, Boundaries and Interface; Characteristics of a System; Types of systems -Physical and Abstract System, Open and Closed Systems, Man-made Systems; Information and its categories.	8
II	**Information System and System Analyst:** Information systems : TPS, OAS, MIS, DSS, ESS; System Analyst: Role and need of system analyst, System Analyst as an agent of change.	7
III	**System Development Life Cycle:** Introduction to SDLC, Various phases: study, analysis, design, development, testing, implementation, maintenance; System documentation: Types of documentation and their importance.	7
IV	**System Planning and Information Gathering:** Initial Investigations, Identification of user needs, Project Identification and Selection; Needs of Information Gathering, Determination of requirements, Information gathering tools: interviews, group communication, questionnaires, presentations and site visits. **Feasibility Study:** Definition, Importance of feasibility study, Types of feasibility study, System selection plan and proposal, Prototyping, Cost-Benefit Analysis: Tools and Techniques.	8
V	**Tools for System Analysis:** Data Flow Diagram (DFD), Logical and Physical DFDs, Developing DFD; System Flowcharts and Structured charts, Structured English, Decision trees and Decision tables.	8
VI	**System Design:** Module specifications, Module Coupling and cohesion, Top-down and bottom-up design; Logical and Physical design, Structured design.	7
VII	Input and Output: Input design: Input data, Input media and devices; Output design; Form Design: Classification of forms, Requirements of Form design.	7

VIII	**System Implementation and Maintenance:** Need of System Testing, Types of System Testing, Quality Assurance; System Conversion, Conversion methods, procedures and controls, System evaluation and performance, Maintenance activities and issues. System Security, Security Threats, Risk Analysis, Control measures, System Audit, Disaster Recovery Planning.	**8**

Suggested Readings:

1. Elias M. Awad, "Systems Analysis and Design", Second Edition, Galgotia Publications, 2010.
2. Arunesh Goyal, "SYSTEMS ANALYSIS AND DESIGN" Prentice Hall India, 2011.
3. Kenneth Kendall, Julie Kendall, "Systems Analysis and Design", 9th edition, Pearson, 2013.
4. Pankaj Jalote : An Integrated Approach to Software Engineering; Springer

Suggestive digital platforms web links:

1. https://www.saigontech.edu.vn/faculty/huynq/SAD/Systems_Analysis_Design_UML_5th%20ed.pdf

Programme/Class: Bachelor in Science		Year: Third	Semester: Fifth
Subject: Computer Application			
Course Code: B0CA503P		**Course Title: Lab on C++ programming based on Course code B0CA501T**	

Course outcomes:

CO 1: To strengthen problem solving ability by using the characteristics of an object-oriented approach.

CO 2: To learn and understand various C++ statements.

CO3: To learn and understand object oriented programming and C++ concepts.

CO4: To learn and understand the concepts of GUI controls and designing GUI applications.

Credits: **2**	**Core Compulsory**
Max. Marks: **25**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **0-0-4**

Suggested Readings:

1. E. Balagurusamy,"Object Oriented Programming with C++", TMH Publication.
2. R.Lafore, "Object Oriented Programming in C-H-, Fourth Edition.2001 Techmedia,
3. S.B.Lippman,"C" Primer;"third Edition, 1998 Addison Wesely.
4. W.Savitch, "Problem Solving with C++", Second Edition, 1999 Pearson Education.
5. B.Stroustrup, "The Elements of C++ Programming," Third Edition, 2000 Addison Wesley.
6. K.V. Venugopal, R. Kumar and T, Tavishankar," Mastering C++, First Edition.

Suggestive digital platforms web links:

1. http://www.lmpt.univ-tours.fr/~volkov/C++.pdf
2. https://www.certiology.com/tutorials/c-plus-plus-tutorial.html

List of Experiments:

1. Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
2. With the help of OOP's write a C++ program for finding area of Circle.
3. Write a C++ program for calculate simple interest, values accepted from keyboard using class and object.
4. Write a C++ program to find the sum of individual digits of a positive integer.
5. Using OOP's write a program C++ input a statement "INDIA IS GREAT " reverse the words (AIDNI SI TAERG)
6. Write a program C++ input a statement calculate number of spaces between the words.
7. Write a C++ program for checking given year is leap year or not using class & object.
8. Using OOP's write a program C++ input a statement calculate number of spaces between the words.
9. Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.
10. Write a C++ program for finding area of triangle using function. (function name is area( )).
11. Write a C++ program for finding factorial of a given number using recursion.

12. Write a C++ Program to find both the largest and smallest number in a list of integers using array.
13. Write a C++ program to sort a list of numbers in ascending order.
14. Write a C++ program for generating Fibonacci series up to 10 terms using constructor.
15. Write a C++ program to demonstrate the Operator Overloading.
16. Write a C++ Program to demonstrate friend function and friend class.
17. Write a C++ Program that illustrates inheritance.
18. Write a C++ program containing a possible exception. use a try block to throw it and a catch block to handle it properly.

Programme/Class: Bachelor in Science	Year: Third	Semester: Fifth

Subject: Computer Application

Course Code: B0CA504P	Course Title: Viva-voce Examination conducted by external examiner at the end of the Session based on Course code B0CA502T

Course outcomes:
CO 1: Understand the concepts of a system.
CO 2: To learn and understand how to develop and implement an information system in different stages of system development life cycle.
CO3: To learn and understand the concept of System Planning and Information Gathering.
CO4: To learn and understand the tools for System Analysis & Design.

Credits: **2**	Core Compulsory
Max. Marks: **25**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **0-0-4**

Viva-voce will be based on Course code B0CA502T *(**System Analysis and Design**). Teacher-in-Charge shall design some problems/case study on* various information systems, SDLC and its phases. *The students shall be required to systematically work out the solution of those problems.*

Programme/Class: Bachelor in Science	Year: Third	Semester: Sixth

Subject: Computer Application	

Course Code: B0CA601T	Course Title: Internet and Web Technology

Course outcomes:
CO 1: Obtain knowledge on Internet technologies.
CO 2: To learn about different kinds of Network protocols that is suited to different kinds of applications.
CO3: Develops the ability to work with internet using various domains, search engines, and many social media platform.
CO4: To understand the basics of HTML.
CO5: Introduces the more advanced features of the WebPages.

Credits: **4**	**Core Compulsory**
Max. Marks: **25+50**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **4-0-0**

Unit	Topic	No. of Lectures
I	Computer Networks: Introduction to computer network, data communication, components of data communication, data transmission mode, data communication measurement, LAN, MAN, WAN, wireless LAN, internet, intranet, extranet.	8
II	Network Models: Client/ server network and Peer-to-peer network, OSI, TCP/IP, layers and functionalities.	7
III	Transmission Media: Introduction, Guided Media: Twisted pair, Coaxial cable, Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite.	7
IV	LAN Topologies: Ring, bus, star, mesh and tree topologies. Network Devices: NIC, repeaters, hub, bridge, switch, gateway and router.	8
V	Internet Terms: Web page, Home page, website, internet browsers, URL, Hypertext, ISP, Domain Names, Web server, download and upload, online and offline.	7
VI	Internet Applications: www, telnet, ftp, e-mail, social networks, search engines, Video Conferencing, e-Commerce, m-Commerce, VOIP, blogs.	7
VII	Introduction to Web Design: Introduction to hypertext markup language (html), Document type definition, creating web pages, lists, hyperlinks, tables, web forms, inserting images, frames, hosting options and domain name registration.	8
VIII	Web Publishing - Website planning, Publishing Tools, The Front Page Solution. Internet Security - Need, Web Search engine, web meta searcher, web search Agents, E-mail Threats, Firewall, Firewall Architecture, Choosing a suitable Firewall.	8

Suggested Readings:

1. Jeffrey C. Jackson Web Technology : A Computer Science Perspective -Pearson

Education 2012.

2. Raj Kamal , Internet and Web Technologies, TATA McGraw Hill 2012Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. Burdman, Jessica, Collaborative Web Development Addison Wesley
4. Xavier, C, Web Technology and Design, New Age International
5. Ivan Bayross, Web Enabled Commercial Application Development Using HTML, DHTML, javascript, Perl CGI , BPB Publications, 2009.
6. B.A. Forouzan, Data Communications and networking, 3rd Edition,TMH
7. W. Stallings, Data Computer Communications, 5th Edition, PHI
8. Ramesh Bangia, "Internet and Web Design" , New Age International.

Suggestive digital platforms web links:

1. https://www.tutorialspoint.com/internet_technologies/index.htm
2. https://matfuvit.github.io/UVIT/predavanja/literatura/TutorialsPoint%20HTML.pdf

Programme/Class: Bachelor in Science	Year: Third	Semester: Sixth

Subject: Computer Application	

Course Code: B0CA602T	Course Title: Cyber Forensics and Cyber Laws

Course outcomes:
CO 1: Impart education with domain knowledge effectively and efficiently in par with the expected quality standards for Digital and Cyber Forensic Science professional.
CO 2: Identify & Evaluate Information Security threats and vulnerabilities in cyber world and apply security measures to real time scenarios.
CO3: Ability to engage in life-long learning and adopt fast changing technology to prepare for professional development..
CO4: Demonstrate the use of standards and cyber laws to enhance information security in the development process and infrastructure protection.

Credits: **4**	Core Compulsory
Max. Marks: **25+50**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **4-0-0**		
Unit	**Topic**	**No. of Lectures**
I	Introduction to Cyber forensics: Information Security Investigations, Corporate Cyber Forensics, Scientific method in forensic analysis, investigating large scale Data breach cases. Analyzing malicious software.	7
II	Types of Computer Forensics Technology, Types of Military Computer Forensic Technology, Types of Law Enforcement: Computer Forensic Technology, Types of Business Computer Forensic Technology, Specialized Forensics Techniques, Hidden Data and How to Find It, Spyware and Adware, Encryption Methods and Vulnerabilities, Protecting Data from Being Compromised Internet Tracing Methods, Security and Wireless Technologies, Avoiding Pitfalls with Firewalls Biometric Security Systems..	8
III	Types of Computer Forensics Systems: Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems, Network Disaster Recovery Systems, Public Key Infrastructure Systems, Wireless Network Security Systems, Satellite Encryption Security Systems, Instant Messaging (IM) Security Systems, Net Privacy Systems, Identity Management Security Systems, Identity Theft, Biometric Security Systems ,Router Forensics. Cyber forensics tools and case studies.	7
IV	Ethical Hacking: Essential Terminology, Windows Hacking, Malware, Scanning, Cracking. Evidence Collection and Data Seizure: Why Collect Evidence, Collection Options Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collection.	8

V	Controlling Contamination: The Chain of Custody, Reconstructing the Attack, The digital crime scene, Investigating Cybercrime, Investigating Web attacks, Investigating network Traffic, Identification of Data: Timekeeping, Forensic Identification and Analysis of Technical Surveillance Devices, Reconstructing Past Events.	7
VI	Basic of law, Understanding cyber space, Defining cyber law, Scope and jurisprudence , Concept of jurisprudence, Overview of Indian legal system, Introduction to IT Act 2000, Amendment in IT Act, intellectual property rights, copyright laws, patent laws, software license.	8
VII	Cyber Crimes – Types of cyber crimes –against individuals institution, and states-various offenses and punishments, digital signature-concepts of public key and private key, certification authorities and their role, creation and authentication of digital signature.	8
VIII	E-contracting: Salient features of E-contracts, formation of E-contracts and types, E-governance, E-governance models, E-commerce- salient features and advantages.	7

Suggested Readings:

1. John Vacca, "Computer Forensics: Computer Crime Scene Investigation", Laxmi Publications, First edition, 2015.
2. Ravi Kumar & B Jain, "Cyber Forensics - Concepts and Approaches", ICFAI University Press, 2006.
3. **Paar**, Christof, **Pelzl**, Jan, "Understanding Cryptography: A Textbook for Students and Practitioners", Springer, 2010
4. Ali Jahangiri, Live Hacking: The Ultimate Guide to Hacking Techniques & Countermeasures for Ethical Hackers & IT Security Experts, 2009, ISBN-13: 978-0984271504
5. Computer Forensics: Investigating Network Intrusions and Cyber Crime (Ec-Council Press Series: Computer Forensics), 2010, ISBN-13: 978-1435483521.
6. Barkha, U Rama Mohan, "Cyber Law & Crimes", Asia Law House; 3rd edition 2017.
7. Vivek Sood, "Cyber Laws Simplified", McGraw Hill, Fourth Edition, 2014

Suggestive digital platforms web links:

3. http://swarm.cs.pub.ro/~mbarbulescu/cripto/Understanding%20Cryptography%20by%20Christof%20Paar%20.pdf

Programme/Class: Bachelor in Science	Year: Third	Semester: Sixth

Subject: Computer Application

Course Code: B0CA603P	Course Title: Lab Based on Web Technology

Course outcomes:

CO 1: Identify common design mistakes when creating a web based application.

CO 2: To learn and understand the process of editing a web page using text editors and web page editors.

CO 3: To cover commonly used HTML tags and discuss how this knowledge is important to a web designer

CO 4: Develops the ability to work for creation of website.

Credits: **2**	**Core Compulsory**
Max. Marks: **25**	Min. Passing Marks: As per UGC/University CBCS norm

Total No. of Lectures-Tutorials-Practical (in hours per week): **0-0-4**

Suggested Readings:

1. HTML5 by Mark Pilgrim O'Reilly publication
2. Ivan Bayross, Web Enabled Commercial Application Development Using HTML, DHTML, javascript, Perl CGI , BPB Publications, 2009.
3. Xavier, C, "Web Technology and Design" , New Age International.

Suggestive digital platforms web links:

1. https://www.tutorialspoint.com/internet_technologies/index.htm
2. https://matfuvit.github.io/UVIT/predavanja/literatura/TutorialsPoint%20HTML.pdf
3. https://wtf.tw/ref/duckett.pdf

List of Experiments:

1. Write an HTML code to create a Web Page for your Personal Information using text formatting tags.
2. Write an HTML code to create a web page to display railway train timings using tables.
3. Write an HTML code to create a sample web page to promote a product using frames and links, images.
4. Write an HTML code to create a form for a questionnaire
5. Write an HTML code to display your education details in a tabular format.
6. Write an HTML code to display your CV on a web page.
7. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.

8. Write an HTML code to create a login form. On submitting the form, the user should get navigated to a profile page.

9. Write an HTML code to create a Registration Form. On submitting the form, the user should be asked to login with this new credentials.

10. Write an HTML code to create your Institute website, Department Website and Tutorial website for specific subject.

11. Write an HTML code to illustrate the usage of the following:

- Ordered List

- Unordered List

- Definition List

12. Write an HTML code to create a frameset having header, navigation and content sections.

13. Write an HTML code to demonstrate the usage of inline CSS.

14. Write an HTML code to demonstrate the usage of internal CSS.

15. Write an HTML code to demonstrate the usage of external CSS.

Programme/Class: Bachelor in Science	Year: Third	Semester: Sixth

Subject: Computer Application		

Course Code: B0CA604P	Course Title: Viva-voce Examination conducted by external examiner at the end of the Session based on Course code B0CA602T	

Course outcomes:

CO 1: Understand about the Cyber Forensic Science.

CO 2: Understand about the various Information Security threats.

CO 3: Understand about the various security policies.

CO 4: Understand about the cyber crime and legal issues related to cyber security.

Credits: **2**	**Core Compulsory**
Max. Marks: **25**	Min. Passing Marks: As per UGC/University CBCS norm
Total No. of Lectures-Tutorials-Practical (in hours per week): **0-0-4**	

Viva-voce will be based on Course code B0CA502T (***Cyber Forensics and Cyber Laws***)*. Teacher-in-Charge shall design some problems/case study on various* Computer Forensics Technology, security policies and legal issues related to cyber security. *The students shall be required to systematically work out the solution of those problems.*