

STUDY SCHEME & SYLLABUS

FOR

B.SC CYBER SECURITY

BATCH-2025

B.SC CYBER SECURITY

Semester I									
Course Code	Course Title	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CCU-101	Mathematics	Core Theory	4	3	1	0	40	60	100
25C2CCU-102	Fundamentals of Computer and IT	Core Theory	4	3	1	0	40	60	100
25C2CSU-101	Problem Solving using C	Core Theory	4	3	1	0	40	60	100
25C2CSU-111	Workshop on Desktop Publishing	Core Theory	2	0	0	4	60	40	100
25C2CCU-103	English	Ability Enhancement	1	1	0	0	40	60	100
25C2HVC- C01	Human Values, De-addiction and Traffic Rules	Ability Enhancement	3	3	0	0	40	60	100
25C2CCU-111	Mentoring and Professional Development	Skill Enhancement	1	0	0	1	25	-	25
25C2CSU-112	Problem Solving using C Laboratory	Core Practical/Laboratory	2	0	0	4	60	40	100
25C2CCU-112	Fundamentals of Computer and IT Laboratory	Core Practical/Laboratory	2	0	0	4	60	40	100
25C2CCU-113	English Practical/Laboratory	Core Practical/Laboratory	1	0	0	2	30	20	50
25C2HVC- C11	Human Values, De-addiction and Traffic Rules (Lab/ Seminar)	Ability Enhancement	1	0	0	1	25	-	25
Total			25	13	3	16	460	440	900

* The Human Values, De-addiction and Traffic Rules (Lab/ Seminar) and Mentoring and Professional Development course will have internal evaluation only.

B.SC CYBER SECURITY

Semester-II									
Course Code	Course Title	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CCU-205	Operating Systems	Core Theory	4	3	1	0	40	60	100
25C2CSU-201	Fundamentals of Cyber Security	Core Theory	4	3	1	0	40	60	100
25C2CSU-202	Object Oriented Programming using C++	Core Theory	4	3	1	0	40	60	100
25C2CSU-212	Object Oriented Programming using C++ Laboratory	Core Practical/Laboratory	2	0	0	4	60	40	100
25C2CCU-215	Operating Systems Laboratory	Core Practical/Laboratory	2	0	0	4	60	40	100
25C2CSU-211	Fundamentals of Cyber Security Lab	Core Practical/Laboratory	2	0	0	4	60	40	100
25C2CCU-211	Mentoring and Professional Development		1	0	0	1	25	-	25
25C2CCU-201	Environmental Studies	Ability Enhancement	2	2	0	0	40	60	100
	Total		21	11	3	13	365	360	725

Semester-III									
Course Code	Course Type	Course Title	Cd	Load Allocation			Marks Distribution		Total Marks
				L	T	P	Internal	External	
25C2CSU-301	Core Theory	Computer Networks	4	3	1	0	40	60	100
25C2CSU-302	Core Theory	Data Structures	4	3	1	0	40	60	100
25C2CSU-303	Core Theory	Programming in Python	3	3	1	0	40	60	100
25C2CSU-304	Core Theory	Ethical Hacking	3	3	0	0	40	60	100
25C2CSU-305	Core Theory	Mathematical Foundations for Cryptography	4	3	1	2	40	60	100
25C2CSU-311	Core Practical/Laboratory	Computer Networks Laboratory	1	0	0	2	60	40	100
25C2CSU-312	Core Practical/Laboratory	Data Structures Laboratory	2	0	0	4	60	40	100
25C2CSU-313	Core Practical/Laboratory	Programming in Python lab	1	0	0	2	30	20	50
25C2CSU-314	Skill Enhancement Course	Career and Placement Planning - 1	1	0	0	2	50	-	50
25C2CSU-315	Value Added Course	**MOOC	0	0	0	2	-	-	S/US
Total			23	15	4	14	400	400	800

Note: ** MOOCs List is to be prepared by the department level committee.

S= Satisfactory, US=Un Satisfactory

Semester-IV									
Course Code	Course Type	Course Title	Cd	Load Allocation			Marks Distribution		Total Marks
				L	T	P	Internal	External	
25C2CSU-401	Core Theory	Database Management System	4	3	1	0	40	60	100
25C2CSU-402	Core Theory	Network Security	4	3	1	0	40	60	100
25C2CSU-403	Skill Enhancement Course-I	Web Technologies	4	3	1	0	40	60	100
25C2CSU-404	Core Theory	Digital Forensics	3	3	0	0	40	60	100
25C2CSU-405	Core Theory	Cyber Laws and IPR	2	0	0	4	60	40	100
25C2CSU-411	Core Practical/Laboratory	Database Management System Laboratory	1	0	0	2	60	40	100
25C2CSU-412	Core Practical/Laboratory	Network Security Lab	3	3	0	0	40	60	100
25C2CSU-413	Skill Enhancement Course-Laboratory	Web Technologies Lab	1	0	0	2	30	20	50
25C2CSU-414	Skill Enhancement Course	Career and Placement Planning - 2	1	0	0	2	50	-	50
25C2CSU-415	Value Added Course	**MOOC	0	0	0	2	-	-	S/US
TOTAL			23	15	3	12	400	400	800

Note: ** MOOCs List is to be prepared by the department level committee.

S= Satisfactory, US=Un Satisfactory

Semester-V									
Course Code	Course Type	Course Title	Cd	Load Allocation			Marks Distribution		Total Marks
				L	T	P	Internal	External	
25C2CSU-501	Skill Enhancement Course-III	Advanced Web Technologies	3	3	0	0	40	60	100
25C2CSU-511	Skill Enhancement Course-Laboratory	Advanced Web Technologies Lab	1	0	0	2	30	20	50
	Open Elective-I		4	3	1	0	40	60	100
	Elective I		4	3	1	0	40	60	100
	Elective-I Laboratory		2	0	0	4	60	40	100
	Elective 2		4	3	1	0	40	60	100
	Elective-II Laboratory		2	0	0	4	60	40	100
25C2CSU-512	Project	Project 1	1	0	0	2	60	40	100
25C2CSU-513	Institutional Summer Training*		1	0	0	2	60	40	100
25C2CSU-514	Skill Enhancement Course	Career and Placement Planning - 3	1	0	0	2	50	-	50
25C2CSU-515	Value Added Course	**MOOC	0	0	0	2	-	-	S/US
	Total		23	12	3	18	480	420	900

Note: ** MOOCs List is to be prepared by the department level committee. S= Satisfactory, US=Un Satisfactory

Elective -I		Elective-I Laboratory	
Course Code	Course Title	Course Code	Course Title
25C2CSU-PE1-01	Linux Operating System	25C2CSU-PE1-11	Linux Operating System Lab
25C2CSU-PE1-02	TCP/IP	25C2CSU-PE1-12	TCP/IP Lab
25C2CSU-PE1-03	Wireless Communication	25C2CSU-PE1-13	Wireless Communication Lab
Elective -II		Elective-II Laboratory	
Course Code	Course Title	Course Code	Course Title
25C2CSU-PE2-01	Cloud Computing	25C2CSU-PE2-11	Cloud Computing Lab
25C2CSU-PE2-02	Penetration Testing Using Open- Source Technologies	25C2CSU-PE2-12	Penetration Testing Using Open- Source Technologies Lab
25C2CSU-PE2-03	Firewall & Intrusion detection	25C2CSU-PE2-13	Firewall & Intrusion detection Lab

Semester-VI									
Course Code	Course Type	Course Title	Load Allocation				Marks Distribution		Total Marks
			Cd	L	T	P	Internal	External	
25C2CSU-601	Skill Enhancement Course-III	Machine Learning	3	3	0	0	40	60	100
25C2CSU-611	Skill Enhancement Course-Laboratory	Machine Learning Lab	1	0	0	2	30	20	50
25C2CSU-612	Project	Project 2	1	0	0	2	60	40	100
	Open Elective-II		4	3	1	0	40	60	100
	Elective III		4	3	1	0	40	60	100
	Elective III Laboratory		2	0	0	4	60	40	100
	Elective IV		4	3	1	0	40	60	100
	Elective IV Lab		2	0	0	4	60	40	100
25C2CSU-613	Skill Enhancement Course	Career and Placement Planning - 4	1	0	0	2	50	-	50
25C2CSU-614	Value Added Course	**MOOC	0	0	0	2	-	-	S/US
Total			22	12	3	16	420	380	800

Note: ** MOOCs List is to be prepared by the department level committee. S= Satisfactory, US=Un Satisfactory

Elective -III	
Course Code	Course Title
25C2CSU-PE3-01	Social Media Security
25C2CSU-PE3-02	R Programming
25C2CSU-PE3-03	Cloud Security Architecture
Elective -IV	
Course Code	Course Title
25C2CSU-PE4-01	Blockchain & Cryptocurrency
25C2CSU-PE4-02	Cyber Attacks

Elective-III Laboratory	
Course Code	Course Title
25C2CSU-PE3-11	Social Media Security Laboratory
25C2CSU-PE3-12	R Programming Laboratory
25C2CSU-PE3-13	Cloud Security Architecture Laboratory
Elective-IV Laboratory	
Course Code	Course Title
25C2CSU-PE4-11	Blockchain & Cryptocurrency Laboratory
25C2CSU-PE4-12	Cyber Attacks Laboratory

SEMESTER 1ST

25C2CCU-101**Mathematics**

Program: B. Sc. Cyber Security	L:3 T:1 P:0
Branch: Computer Applications	Credits: 4
Semester: 1 st	Contact hours: 44 hours
Internal max. marks: 40	Theory/Practical: Theory
External max. marks: 60	Duration of end semester exam (ESE): 3hrs
Total marks: 100	Elective status: core/elective: Core

Prerequisite: Student must have the knowledge of Basic Mathematics.

Co requisite: NA.

Additional material required in ESE: Minimum two exercises of each concept will be recorded in the file and the file will be submitted in End Semester Examinations.

Course Outcomes: After studying this course, students will be able to:

CO#	Course Outcomes
CO1	define various mathematical set notations.
CO2	explain different logical terms used in basic mathematics.
CO3	illustrate various operations and formulas by matrix algebra.
CO4	summarize the finite number of quantities in AP and GP.

Detailed contents	Contact hours
<u>Unit-I</u> Set Introduction, Objectives, Representation of Sets (Roster Method, Set Builder Method), Types of Sets (Null Set, Singleton Set, Finite Set, Infinite Set, Equal Set, Equivalent Set, Disjoint Set, Subset, Proper Subset, Power Set, Universal Set) and Operation with Sets (Union of Set, Intersection of Set, Difference of Set, Symmetric Difference of Set) Universal Sets, Complement of a Set.	12 hours
<u>Unit-II</u> Logic Statement, Connectives, Basic Logic Operations (Conjunction, Disjunction, Negation) Logical Equivalence/Equivalent Statements, Tautologies and Contradictions.	10 hours

<u>Unit –III</u> Matrices Introduction, Types of Matrix (Row Matrix, Column Matrix, Rectangular Matrix, Square Matrix, Diagonal Matrix, Scalar Matrix, Unit Matrix, Null Matrix, Comparable Matrix, Equal Matrix), Scalar Multiplication,	12 hours
Negative of Matrix, Addition of Matrix, Difference of two Matrix, Multiplication of Matrices, Transpose of a Matrix.	
<u>Unit-IV</u> Progressions Introduction, Arithmetic Progression, Sum of Finite number of quantities in A.P, Arithmetic Means, Geometric Progression, Geometric Mean.	10 hours

Text Books:

1. Discrete Mathematics and Its Applications by Kenneth H. Rosen, Mc Graw Hill, 6th Edition.
2. College Mathematics, Schaum's Series, TMH.

Reference Books:

1. Elementary Mathematics, Dr. R D Sharma
2. Comprehensive Mathematics, Parmanand Gupta
3. Elements of Mathematics, M L Bhargava

E Books/ Online learning material

1. www.see.leeds.ac.uk/geo-maths/basic_maths.pdf
2. www.britannica.com/science/matrix-mathematics
3. www.pdfdrive.com/schaums-outline-of-discrete-mathematics-third-edition-schaums-e6841453.html

25C2CCU-102
Fundamentals of Computer and IT

Program: B. Sc. Cyber Security	L: 3 T: 1 P: 0
Branch: Computer Applications	Credits: 4
Semester: 1 st	Contact hours: 44 hours
Internal max. marks: 40	Theory/Practical: Theory
External max. marks: 60	Duration of end semester exam (ESE): 3hrs
Total marks: 100	Elective status: Core

Prerequisite: -NA-

Co requisite: -NA-

CO#	Course outcomes
CO1	explain the concept of input and output devices of computers.
CO2	classify types of computers, their processing and networking with other computing systems and devices.
CO3	analyze operating system and its working to solve problems related to operating systems.
CO4	describe word processing, spreadsheet and presentation graphics software skills.
CO5	make use of the Internet safely, legally, and responsibly.

Additional material required in ESE: -NA-

Course Outcomes:

Detailed Contents	Contact hours
Unit-I Human Computer Interface Concepts of Hardware and Software; Data and Information. Functional Units of Computer System: CPU, registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors. Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter. Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks. Data Representation: Bit, Byte, Binary, Decimal, Hexadecimal, and Octal Systems, Conversions and Binary Arithmetic (Addition/ Subtraction/ Multiplication) Applications of IT.	12

Unit-II Concept of Computing, Types of Languages: Machine, assembly and High level Language; Operating system as user interface, utility programs. Word processing: Editing features, formatting features, saving, printing, table handling, page settings, spell-checking, macros, mail-merge, equation editors.	10
Unit-III Spreadsheet: Workbook, worksheets, data types, operators, cell formats, freeze panes, editing features, formatting features, creating formulas, using formulas, cell references, replication, sorting, filtering, functions, Charts & Graphs. Presentation Graphics Software: Templates, views, formatting slide, slides with graphs, animation, using special features, presenting slide shows	10
Unit-IV Electronic Payment System: Secure Electronic Transaction, Types of Payment System: Digital Cash, Electronic Cheque, Smart Card, Credit/Debit Card E-Money, Bit Coins and Crypto currency, Electronic Fund Transfer (EFT), Unified Payment Interface (UPI), Immediate Payment System (IMPS), Digital Signature and Certification Authority. Introduction to Bluetooth, Cloud Computing, Big Data, Data Mining, Mobile Computing and Embedded Systems and Internet of Things (IoT)	12

Text Books:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education
2. Computer Fundamentals, A. Goel, 2010, Pearson Education.
3. Fundamentals of Computers, P. K. Sinha & P. Sinha, 2007, BPB Publishers.
4. IT Tools, R.K. Jain, Khanna Publishing House
5. "Introduction to Information Technology", Satish Jain, Ambrish Rai & Shashi Singh, Paperback Edition, BPB Publications, 2014.

Reference Books:

1. "Introduction to Computers", Peter Norton
2. Computers Today, D. H. Sanders, McGrawHill.
3. "Computers", Larry long & Nancy long, Twelfth edition, PrenticeHall.
4. Problem Solving Cases in Microsoft Excel, Joseph Brady & Ellen F Monk, Thomson Learning

E Books/ Online learning material

1. www.sakshat.ac.in
2. <https://swayam.gov.in/course/4067-computer-fundamentals>

25C2CSU-101
Problem Solving using C

Program: B. Sc. Cyber Security	L: 3 T: 1 P: 0
Branch: Computer Applications	Credits: 4
Semester: 1 st	Contact hours: 44 hours
Internal max. marks: 40	Theory/Practical: Theory
External max. marks: 60	Duration of end semester exam (ESE): 3hrs
Total marks: 100	Elective status: Core

Prerequisite: -NA-

Co requisite:-NA-

Additional material required in ESE: -NA-

Course Outcomes:

CO#	Course outcomes
CO1	construct the logical flow used in programming.
CO2	design algorithms for solving various real life problems using C.
CO3	develop programs using C.
CO4	define different data types and control statements.
CO5	explain various concepts of C programming languages.

Detailed Contents	Contact hours
Unit-I Logic Development: Data Representation, Flowcharts, Problem Analysis, Decision Trees/Tables, Pseudo code and algorithms. Fundamentals: Character set, Identifiers and Key Words, Datatypes, Constants, Variables, Expressions, Statements, Symbolic Constants. Operations and Expressions: Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators, Library functions.	11
Unit-II Data Input and Output: formatted & unformatted input output. Control Statements: While, Do-while and For statements, Nested loops, If-else, Switch, Break – Continue statements.	10
Unit-III Functions: Brief overview, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion. Arrays: Defining, processing arrays, passing arrays to a function, multi-dimensional arrays. Strings: String declaration, string functions and string manipulation Program Structure Storage Class: Automatic, external and static variables.	11

Unit-IV Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, unions. Pointers: Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialization of Pointer Variables, Accessing a Variable through its Pointer, Pointers and Arrays File Handling: File Operations, Processing a Data File	12
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Text Books:

1. Programming in ANSI C, E. Balagurusami, Fourth Edition, Tata Mc Graw Hill.
2. Programming in C, Third Edition, Stephen G Kochan, Pearson.
3. The C Programming Language, Kernighan & Richie, Second Edition, PHI Publication.

Reference Books:

1. Object Oriented Programming, Lafore R, Third Edition, Galgotia Publications
2. Let us C, Yashvant P Kanetkar, Seventh Edition, BPB Publications, New Delhi.
3. Programming in C, Byron S. Gottfried, Second Edition, Mc Graw Hills.
4. Problem Solving and Programming in C, R.S. Salaria, Second Edition
5. Programming in C, Atul Kahate.

25C2CSU-111
Workshop on Desktop Publishing

Program: B. Sc. Cyber Security	L: 0 T: 0 P: 4
Branch: Computer Applications	Credits: 2
Semester: 1 st	Contact hours: 4 hours per week
Internal max. marks: 60	Theory/Practical: Practical
External max. marks: 40	Duration of end semester examinations (ESE): 3hrs
Total marks: 100	Elective status: Core

Prerequisite: Students must have basic understanding of designing/ Painting tools.

Co requisite: Printing & Publishing tools.

Additional material required in ESE: Softcopy & Hardcopy of the exercises are to be maintained during the practical labs and to be submitted during the End Semester Examinations.

Course Outcomes: After studying this course, students will be able to:

CO#	Course outcomes
CO1	define various publishing's expert abilities tools for printing, publishing and designing purpose.
CO2	experiment with designing tools to enhance your printing job skills.
CO3	build ideas and expertise in the realm of design, encompassing practical experience from text preparation.
CO4	build the different professional abilities, designing brochures, flexes, business cards, certificates and newsletter layouts.

Instructions: Instructor can increase/decrease the experiments as per the requirement.

Assignments:

1.	Design and print a <i>Title Page</i> of a Magazine/Book.
2.	Prepare multiple designs for a <i>Flex</i> by using different Tools.
3.	Prepare <i>NSS Certificates</i> for appreciation using logos of University, College & NSS unit.
4.	Prepare 5 different Designing of <i>Business Cards</i> .
5.	Prepare <i>Envelops</i> displaying full address of the company by inserting graphical symbol/ logos of company.
6.	Design and Print <i>Invoices</i> for three companies.
7.	Prepare and print <i>News Letter Layouts</i> for any five activities of your college/ university.
8.	Prepare <i>Invitation Cards</i> for cultural meet held in your college.

9.	Design and print <i>Brochures</i> to advertise a “Blood Donation Camp” in your college.
10.	Design <i>Logos</i> of your college, University & Govt. of Punjab also display these logos on black background as water mark.
11.	Design, Print and Publish 5 motivations Playcards.
12.	Design & Print assignment book of minimum 20 Pages an any Topic.
13.	Design & Print any five most important activities of your college in a collage.
14.	Design & Print Question Paper of any Subject.
15.	Assemble all the latest news cutting of your activities on a 10 X 8 size flex.

Reference Books:

1. DTP Course, by Shirish Chavan published by Rapidex.
2. DTP Course Kit by Vikas Gupta published by Comdex.
3. CorelDraw 9 by David Karlins published by Techmedia.
4. Adobe Illustrator CC by Brian Wood published by Adobe Press.
5. Page Maker in Easy Steps – Scott Basham.

Software Tools:

1. Adobe Illustrator 14.
2. CorelDraw Graphics Suit.
3. GNU image manipulation program.
4. Ink Scape.
5. PhotoScapeSetup
6. PM701.

25C2CSU-112
Problem Solving using C Laboratory

Program: B. Sc. Cyber Security	L: 0 T: 0 P:4
Branch: Computer Applications	Credits: 2
Semester: 1 st	Contact hours: 4 hours per week
Internal max. marks: 60	Theory/Practical: Practical
External max. marks: 40	Duration of end semester exam (ESE): 3hrs
Total marks: 100	Elective status: Core

Prerequisite: -NA-

Co requisite:-NA-

Additional material required in ESE: -NA-

Course Outcomes:

CO#	Course Outcomes
CO1	explain the basic computer concepts and programming principles of C language.
CO2	demonstrate the applications of derived data types such as arrays, pointers, strings and functions.
CO3	apply the C-language syntax rules to correct the bugs in the C program.
CO4	develop C programs to solve simple mathematical and decision making problems.

1.	WRITE A PROGRAM to display your name. Write another program to print message with inputted name.
2.	WRITE A PROGRAM to add two numbers.
3.	WRITE A PROGRAM to find the square of a given number.
4.	WRITE A PROGRAM to calculate the average of three real numbers.
5.	Write a program to Find ASCII Value of a Character
6.	WRITE A PROGRAM to Find the Size of int, float, double and char
7.	WRITE A PROGRAM to Compute Quotient and Remainder
8.	WRITE A PROGRAM to accept the values of two variables.
9.	WRITE A PROGRAM to find the simple interest, inputs are amount, period in years and rate of interest.
10.	Basic salary of an employee is input through the keyboard. The DA is 25% of the basic salary while the HRA is 15% of the basic salary. Provident Fund is deducted at the rate of 10% of the gross salary(BS+DA+HRA). WRITE A PROGRAM to calculate the net salary
11.	WRITE A PROGRAM to find area of a circle using PI as constant
12.	WRITE A PROGRAM to find volume of a cube using side as input from user
13.	WRITE A PROGRAM using various unformatted Input Functions

Instructions: Develop all programs in C programming language.

Assignments:

14.	WRITE A PROGRAM to find area of rectangle and print the result using unformatted output Functions
15.	WRITE A PROGRAM to find the larger of two numbers.
16.	WRITE A PROGRAM to find greater of three numbers using Nested If.
17.	WRITE A PROGRAM to find whether the given number is even or odd.
18.	WRITE A PROGRAM to Generate Multiplication Table Using for loop
19.	WRITE A PROGRAM to Generate Multiplication Table Using while loop
20.	WRITE A PROGRAM to Make a Simple Calculator Using switch...case
21.	WRITE A PROGRAM to find whether the given number is a prime number.
22.	WRITE A PROGRAM using function to find the largest of three numbers
23.	WRITE A PROGRAM using function to print first 20 numbers and its squares.
24.	WRITE A PROGRAM to find the factorial of a given number.
25.	WRITE A PROGRAM to print the sum of two matrices
26.	WRITE A PROGRAM to Find the Length of a String
27.	WRITE A PROGRAM to Copy String using strcpy()
28.	WRITE A PROGRAM to compare a string
29.	WRITE A PROGRAM to reverse a string
30.	WRITE A PROGRAM to reverse a string
31.	WRITE A PROGRAM to multiply two numbers using pointers.
32.	WRITE A PROGRAM to display address of variable using pointers
33.	WRITE A PROGRAM to show the memory occupied by Structure and Union
34.	WRITE A PROGRAM to create Student I-Card using a Structure
35.	WRITE A PROGRAM to read data from a file from a file
36.	WRITE A PROGRAM to save Employee details in a file using File Handling

25C2CCU-112
Fundamentals of Computer and IT Laboratory

Program: B. Sc. Cyber Security	L: 0 T: 0 P: 4
Branch: Computer Applications	Credits: 2
Semester: 1 st	Contact hours: 4 hours per week
Internal max. marks: 60	Theory/Practical: Practical
External max. marks: 40	Duration of end semester exam (ESE): 3hrs
Total marks: 100	Elective status: Core

Prerequisite: -NA-

Co requisite:-NA-

Additional material required in ESE: - NA-

Course Outcomes:

CO#	Course outcomes
CO1	experiment with Open Office applications for word processing, spreadsheets, and presentations.
CO2	utilize text boxes and paragraphs formatting techniques in newsletter design.
CO3	apply documentation and accounting operations using various software tools.
CO4	create interactive presentations in PowerPoint using different tools.

Instructions:

Word Orientation:	
The instructor needs to give an overview of word processor. Details of the four tasks and features that would be covered Using word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.	
1.	Using word to create Resume Features to be covered:-Formatting Fonts In word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.
2.	Creating an Assignment Features to be covered: - Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.
3.	Creating a Newsletter Features to be covered :- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs
4.	Creating a Feedback form Features to be covered :- Forms, Text Fields, Inserting objects, Mail Merge in Word.
Excel Orientation:	

The instructor needs to tell the importance of Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered Excel – Accessing, overview of toolbars, saving excel files,	
1.	Creating a Scheduler Features to be covered :- Gridlines, Format Cells, Summation, auto fill, Formatting Text
2.	Calculations Features to be covered :- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP
3.	Performance Analysis Features to be covered :- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting
4.	Game (like Cricket, badminton) Score Card Features to be covered :- Pivot Tables, Interactive Buttons, Importing Data, Data Protection, Data Validation
Presentation Orientation:	
1.	Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered includes: - PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows
2.	This session helps students in making their presentations interactive. Topics covered includes: Hyperlinks, Inserting–Images, ClipArt, Audio, Video, Objects, Tables and Charts
3.	Concentrating on the in and out of Microsoft power point. Helps them learn best practices in designing and preparing power point presentation. Topics covered includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slideslotter, notes etc), Inserting – Background, textures, Design Templates, Hiddenslides. Autocontentwizard, Slide Transition, Custom Animation, Auto Rehearsing
4.	Power point test would be conducted. Students will be given model power point presentation which needs to be replicated
Internet and its Applications	
The instructor needs to tell the how to configure Web Browser and to use search engines by defining search criteria using Search Engines	
1.	To learn to setup an e-mail account and send and receive e-mails
2.	To learn to subscribe/post on a blog and to use torrents for accelerated downloads
3.	Hands on experience in online banking and Making an online payment for any domestic bill

Reference Books:

1. IT Tools, R.K. Jain, Khanna Publishing House. Introduction to Information

Technology, ITL Education Solutions limited, Pearson Education.

2. Introduction to information technology, Turban, Rainer and Potter, John Wiley and Sons.
3. Problem Solving Cases in Microsoft Excel, Joseph Brady & Ellen F Monk, Thomson Learning.

AECC (For UGC courses)
25C2CCU-103 English:

Course Code	Course Outcomes
CO1	explain the concept of business communication along with the prerequisites for an effective communication.
CO2	classify business communication with respect to its form (reading, writing, spoken), setting of usage (personal, social, business, interpersonal, intrapersonal or group).
CO3	apply the knowledge and skills of business communication in areas of speaking, reading and writing presentations.
CO4	explain the barriers of effective business communication.
CO5	improve professional communication like reading and writing skills.

The recommended readings given at the end are only suggestive; the students and teachers have the freedom to consult other material on various units/topics given below. Similarly, the questions in the examination will be aimed towards assessing the skills learnt by the students rather than the textual content of the recommended books.

Detailed Contents:

Unit1- 1 (Introduction)

- Theory of Communication
- Types and modes of Communication

Unit- 2 (Language of Communication)

- Verbal and Non-verbal
- (Spoken and Written)
- Personal, Social and Business
- Barriers and Strategies
- Intra-personal, Inter-personal and Group communication

Unit-3 (Reading and Understanding)

- Close Reading
- Comprehension
- Summary Paraphrasing
- Analysis and Interpretation
- Translation (from Hindi/Punjabi to English and vice-versa)

OR

Precis writing /Paraphrasing (for International Students)

- Literary/Knowledge Texts

Unit-4 (Writing Skills)

- Documenting
- Report Writing
- Making notes
- Letter writing

Recommended Readings:

1. *Fluency in English* - Part II, Oxford University Press, 2006.
2. *Business English*, Pearson, 2008.
3. *Language, Literature and Creativity*, Orient Blackswan, 2013.
4. *Language through Literature* (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas
5. *On Writing Well*. William Zinsser. Harper Resource Book. 2001
6. *Study Writing*. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.

AECC
25C2CCU-113
English Practical/Laboratory

Course Code	Course Outcomes
CO1	build english vocabulary and language proficiency.
CO2	improve their professional communication through reading and writing practices.
CO3	develop vital communication skills which are integral to personal, social and professional interactions.
CO4	identify common errors in spoken and written communication.
CO5	make use of english language as an independent user.

The recommended readings given at the end are only suggestive; the students and teachers have the freedom to consult other material on various units/topics given below. Similarly, the questions in the examination will be aimed towards assessing the skills learnt by the students rather than the textual content of the recommended books.

Interactive practice sessions in Language Lab on Oral Communication

- Listening Comprehension
- Self Introduction, Group Discussion and Role Play
- Common Everyday Situations: Conversations and Dialogues
- Communication at Workplace
- Interviews
- Formal Presentations
- Monologue
- Effective Communication/ Mis-Communication
- Public Speaking

Recommended Readings:

1. *Fluency in English* - Part II, Oxford University Press, 2006.
2. *Business English*, Pearson, 2008.
3. *Practical English Usage*. Michael Swan. OUP. 1995.
4. *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

5. *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad.
Oxford University Press

25C2HVC-C01

Human Values, De-addiction and Traffic Rules

Program: B. Sc. Cyber Security	L: 3 T: 0 P: 0
Branch: Computer Applications	Credits: 3
Semester: 1 st	Contact hours: 33 hours
Internal max. marks: 40	Theory/Practical: Theory
External max. marks: 60	Duration of end semester exam (ESE): 3hrs
Total marks: 100	Elective status: Ability Enhancement

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

Course Code	Course Outcomes
CO1	explain the concept of value education, with respect to an individual's understanding of self, ambitions, happiness and prosperity.
CO2	interpret the need of self (I) and body to ensure harmony in a human.
CO3	construct a holistic view towards society as a whole and the role of human-to-human interaction in it.
CO4	analyze harmony in the nature and existence.
CO5	elaborate the knowledge on ethical human values and its implication on modern day professional requirement.

Note: This course is intended to provide a much needed orientation input in Value Education to the young enquiring minds.

Detailed Contents	Contact hours
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Unit-I Course Introduction - Need, Basic Guidelines, Content and Process for Value Education 1. Understanding the need, basic guidelines, content and process for Value Education 2. Self-Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self-exploration 3. Continuous Happiness and Prosperity- A look at basic Human Aspirations 4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority 5. Understanding Happiness and Prosperity correctly-Acritical appraisal of the current scenario 6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels	8
Unit-II Understanding Harmony in the Human Being - Harmony in Myself! 1. Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’ 2. Understanding the needs of Self (‘I’) and ‘Body’ - <i>Sukh</i> and <i>Suvidha</i> 3. Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer) 4. Understanding the characteristics and activities of ‘I’ and harmony in ‘I’ 5. Understanding the harmony of I with the Body: <i>Sanyam</i> and <i>Swasthya</i>; correct appraisal of Physical needs, meaning of Prosperity in detail 6. Programs to ensure <i>Sanyam</i> and <i>Swasthya</i> - Practice Exercises and Case Studies will be taken up in Practice Sessions.	8
Unit-III Understanding Harmony in the Family and Society-Harmony in Human-Human Relationship 1. Understanding harmony in the Family- the basic unit of human interaction 2. Understanding values in human-human relationship; meaning of <i>Nyaya</i> and program for its fulfillment to ensure <i>Ubhay-tripti</i>; Trust (<i>Vishwas</i>) and Respect (<i>Samman</i>) as the foundational values of relationship 3. Understanding the meaning of <i>Vishwas</i>; Difference between intention	6

and competence - Understanding the meaning of <i>Samman</i>, Difference between respect and differentiation; the other salient values in relationship - Understanding the harmony in the society (society being an extension of family): <i>Samadhan</i>, <i>Samridhi</i>, <i>Abhay</i>, <i>Sah-astitva</i> as comprehensive Human Goals - Visualizing a universal harmonious order in society- Undivided Society (<i>Akhand Samaj</i>), Universal Order (<i>Sarvabhaum Vyawastha</i>)- from family to world family! - Practice Exercises and Case Studies will be taken up in Practice Sessions.	
Unit-IV Understanding Harmony in the Nature and Existence - Whole existence as Co-existence - Understanding the harmony in the Nature - Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature - Understanding Existence as Co-existence (<i>Sah-astitva</i>) of mutually interacting units in all-pervasive space - Holistic perception of harmony at all levels of existence - Practice Exercises and Case Studies will be taken up in Practice Sessions.	5
Unit-V Implications of the above Holistic Understanding of Harmony on Professional Ethics - Natural acceptance of human values - Definitiveness of Ethical Human Conduct - Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order - Competence in professional ethics: - Ability to utilize the professional competence for augmenting universal human order, - Ability to identify the scope and characteristics of people- friendly and eco-friendly production systems, - Ability to identify and develop appropriate technologies and management patterns for above production systems. - Case studies of typical holistic technologies, management models and production systems - Strategy for transition from the present state to Universal Human Order: - At the level of individual: as socially and	6

ecologically responsible engineers, technologists and managers b) At the level of society: as mutually enriching institutions and organizations.	
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Text Book

1. R R Gaur, R Sangal, G P Bagaria, 2009, *A Foundation Course in Value Education*.

Reference Books

1. Ivan Illich, 1974, *Energy & Equity*, The Trinity Press, Worcester, and Harper Collins, USA.
2. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
3. A Nagraj, 1998, *Jeevan Vidya ek Parichay*, Divya Path Sansthan, Amarkantak.
4. Susan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986, 1991.
5. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Common wealth Publishers.
6. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.
7. Subhas Palekar, 2000, *How to practice Natural Farming*, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *Limits to Growth – Club of Rome's report*, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, *Fundamentals of Ethics for Scientists & Engineers*, Oxford University Press
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, *Engineering Ethics (including Human Values)*, Eastern Economy Edition, Prentice Hall of India Ltd.
11. B P Banerjee, 2005, *Foundations of Ethics and Management*, Excel Books.
12. BL Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, <http://uhv.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, *An Inconvenient Truth*, Paramount Classics, USA
4. Charlie Chaplin, *Modern Times*, United Artists, USA
5. IIT Delhi, *Modern Technology – the Untold Story*

25C2HVC-C11**Human Values, De-addiction and Traffic Rules (Lab/ Seminar)**

Program: B. Sc. Cyber Security	L: 0 T: 0 P: 1
Branch: Computer Applications	Credits: 1
Semester: 1 st	Contact hours: 1 hour per week
Internal max. marks: 25	Theory/Practical: Practical
External max. marks: 0	Duration of end semester exam (ESE): 3hrs
Total marks: 25	Elective status: Ability Enhancement

Course Code	Course Outcomes
CO1	estimate the development of Holistic perspective among students towards life,profession and happiness.
CO2	identify the essential complementarily between “VALUES” and “SKILLS” to ensure sustained happiness and prosperity..
CO3	examine the value-based living in a natural way.
CO4	formulate plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior.
CO5	outline the responsibilities of a manager for society and organization in the era of globalization at workplace..

One each seminar will be organized on Drug De-addiction and Traffic Rules. Eminent scholar and experts of the subject will be called for the Seminar at least once during the semester. It will be binding for all the students to attend the seminar.

25C2CCU-111

Guidelines regarding Mentoring and Professional Development

The objective of mentoring will be development of:

- Overall Personality
- Aptitude (Technical and General)
- General Awareness (Current Affairs and GK)
- Communication Skills
- Presentation Skills

Course Outcomes:

Course Code	Course Outcomes
CO1	apply communication skills in today's workplace to facilitate ability to work collaboratively.
CO2	outline the understanding of effective group discussion and interview etiquettes.
CO3	identify the different techniques of communication.
CO4	explain various elements of group dynamics, team building activity and cooperation.
CO5	develop leadership qualities for fostering creativity and collaboration.

The course shall be split in two sections i.e. outdoor activities and class activities. For achieving the above, suggestive list of activities to be conducted are:

Part – A (Class Activities)

1. Expert and video lectures
2. Aptitude Test
3. Group Discussion
4. Quiz(General/Technical)
5. Presentations by the students
6. Team building Exercises

Part – B (Outdoor Activities)

1. Sports/NSS/NCC
2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club,etc.

Evaluation shall be based on rubrics for Part – A & B

Mentors/Faculty in charges shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.

SEMESTER 2ND

25C2CCU-205 Operating Systems

Program: B Sc	L:3 T:1 P:0
Branch: Cyber Security	Credits: 4
Semester: 4 th	Contact hours: 44 hours
Theory/Practical: Theory	Percentage of numerical/design problems: 15%
Internal max. marks: 40	Duration of end semester exam (ESE): 3hrs
External max. marks: 60	Elective status: Core
Total marks: 100	

Prerequisite: Basic understanding of computer system.

Co requisite: -NA-

Additional material required in ESE: -NA- Course

Outcomes: Students will be able to:

CO#	Course outcomes
CO1	evaluate various types of operating systems.
CO2	explain different resource managements performed by operating system.
CO3	define the architecture in terms of functions performed by different types of operating systems.
CO4	analyze the performance of different algorithms used in design of operating system components.
CO5	compare the key properties of different types of operating systems.

Detailed contents	Contact hours
Unit-I Fundamentals of Operating system: Introduction to Operating system, Functions of an operating system. Operating system as a resource manager. Structure of operating system (Role of kernel and Shell). Views of operating system. Evolution and types of operating systems. Process & Thread Management: Program vs. Process; PCB, State transition diagram, Scheduling Queues, Types of schedulers, Concept of Thread, Benefits, Types of threads, Process synchronization. CPU Scheduling: Need of CPU scheduling, CPU I/O Burst Cycle, Preemptive vs. Non-pre-emptive scheduling, Different scheduling criteria's, scheduling algorithms (FCSC, SJF, Round-Robin, Multilevel Queue).	12

Unit-II Memory Management: Introduction, address binding, relocation, loading, linking, memory sharing and protection; Paging and segmentation; Virtual memory: basic concepts of demand paging, page replacement algorithms.	12
Unit-III I/O Device Management: I/O devices and controllers, device drivers; disk storage. File Management: Basic concepts, file operations, access methods, directory structures and management, remote file systems; file protection.	08
Unit-IV Advanced Operating systems: Introduction to Distributed Operating system, Characteristics, architecture, Issues, Communication & Synchronization; Introduction Multiprocessor Operating system, Architecture, Structure, Synchronization & Scheduling; Introduction to Real-Time Operating System, Characteristics, Structure & Scheduling. Case study of Linux operating system	12

Text Books:

1. Operating System Principles by Abraham Silberschatz and Peter Baer Galvin, Seventh Edition, Published byWiley-India.
2. Principals of Operating System by Naresh Chauhan, Published by OXFORD University Press,India.

Reference Books:

1. Operating Systems by Sibsankar Haldar and Alex A. Aravind, Published by PearsonEducation.
2. Operating system by Stalling, W., Sixth Edition, Published by Prentice Hall (India)

25C2CSU-201
Fundamentals of Cyber Security

Program: B. Sc. Cyber Security	L: 3 T: 1 P: 0
Branch: Computer Applications	Credits: 4
Semester: 2 nd	Contact hours: 44 hours
Theory/Practical: Theory	Percentage of numerical/design problems: --
Internal max. marks: 40	Duration of end semester exam (ESE): 3hrs
External max. marks: 60	Elective status: Core
Total marks: 100	

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: Students will be able to

CO#	Course outcomes
CO1	describe the essential cyber security knowledge areas.
CO2	explain the different precautions that are necessary to keep cyberspace safe.
CO3	determine the different cyber security threats.
CO4	analyze the basic functionalities of cybersecurity technologies.

Detailed contents	Contact hours
Unit-I Introduction to Cyber Space: History of Internet, Cyber Crime, Information Security, Computer Ethics and Security Policies, Choosing the Best Browser according to the requirement and email security, Guidelines to choose web browsers, Securing web browser, Antivirus ,Email. Guidelines for secure password and wi-fi security: Guidelines for setting up a Secure password, Two-steps Password management, Wi-Fi Security. Guidelines for social media and basic Windows security: Guidelines for social media.	12
Unit-II Smartphone security guidelines: Introduction to mobile phones, Smartphone Security, Android Security, IOS Security. Cyber Security Initiatives in India: Counter Cyber Security Initiatives in India, Cyber Security Exercise, Cyber Security Incident Handling.	10
Unit-III Online Banking, Credit Card and UPI Security: Overview of Online Banking Security, Mobile Banking Security, Security of Debit and Credit Card, UPI Security.	12

Unit-IV Cyber Security Threat Landscape and Techniques: Cyber Security Threat Landscape, Emerging Cyber Security threats ,Cyber Security Techniques, Firewall. IT Security Act and Misc. Topics: IT Act ,Hackers-Attacker-Countermeasures ,Web Application Security ,Digital Infrastructure Security,Defensive Programming.	10
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Text Books:

1. Introduction to Cyber Security available at <http://uou.ac.in/foundation-course>
2. Fundamentals of Information Security <http://uou.ac.in/progdetail?pid=CEGCS-17>
3. Cyber Security Techniques <http://uou.ac.in/progdetail?pid=CEGCS-17>
4. Cyber Attacks and Counter Measures: User Perspective <http://uou.ac.in/progdetail?pid=CEGCS-17>
5. Information System <http://uou.ac.in/progdetail?pid=CEGCS-17>

Reference Books:

Introduction to Cyber Security: Jatindra Pandey.

25C2CSU-202
Object Oriented Programming using C++

Program: B. Sc. Cyber Security	L: 3 T: 1 P: 0
Branch: Computer Applications	Credits: 4
Semester: 2 nd	Contact hours: 44 hours
Internal max. marks: 40	Theory/Practical: Theory
External max. marks: 60	Duration of end semester exam (ESE): 3hrs
Total marks: 100	Elective status: Core

Prerequisite: -NA- Co
requisite: -NA-

Additional material required in ESE: -NA- Course

Outcomes:

CO#	Course outcomes
CO1	elaborate the programming from real world examples.
CO2	explain object oriented approach for finding solutions to various problems with the help of C++ language.
CO3	construct computer based solutions to various real-world problems using C++.
CO4	make use of various concepts of object oriented approach towards problem solving.
CO5	elaborate the programming from real world examples.

Detailed Contents	Contact hours
Unit-I Principles of object oriented programming Introduction to OOP and its basic features, Basic components of a C++, Program and program structure, Compiling and Executing C++ Program. Difference between Procedure Oriented Language(C) and Object Oriented Language	12
Unit-II Classes & Objects and Concept of Constructors Defining classes, Defining member functions, Declaration of objects to class, Access to member variables from objects, Different forms of member functions, Access specifiers (Private, public, protected), Array of objects. Introduction to constructors, Parameterized constructors, Copy Constructor, Multiple constructors in class, Dynamic initialization of objects, Destructors.	10

Unit-III Inheritance and Operator overloading Introduction to Inheritance, Types of inheritance:-Single inheritance, Multiple inheritance, Multilevel inheritance, Hierarchical inheritance, Hybrid inheritance, Defining operator overloading, Overloading of Unary and Binary operators, Rules for overloading operators	12
Unit-IV Polymorphism and File Handling Early Binding, Late Binding, Virtual Functions, pure virtual functions, Abstract Classes. Opening and Closing File, Reading and Writing a file.	10

Text Books:

1. Object Oriented Programming with C++, E. Balagurusami, Fourth Edition, Tata Mc-Graw Hill.
2. Object Oriented Programming in Turbo C++, Robert Lafore, Fourth Edition Galgotia Publications.
3. The C++ Programming Language, Bjarna Stroustrup, Third Edition, Addison-Wesley Publishing Company.
4. Object Oriented Programming Using C++, Salaria, R.S, Fourth Edition, Khanna Book Publishing.

25C2CSU-212
Object Oriented Programming using C++ Laboratory

Program: B. Sc. Cyber Security	L: 0 T: 0 P: 4
Branch: Computer Applications	Credits: 2
Semester: 2 nd	Contact hours: 4 hours per week
Internal max. marks: 60	Theory/Practical: Practical
External max. marks: 40	Duration of end semester exam (ESE): 3hrs
Total marks: 100	Elective status: Core

Prerequisite: -NA- Co
requisite: -NA-

Additional material required in ESE: -NA- Course

Outcomes:

CO#	Course outcomes
CO1	differentiate structure oriented programming and object oriented programming.
CO2	explain the concepts of operator overloading, function overloading & polymorphism.
CO3	apply the concept of files, templates and exceptions handling.
CO4	sevelop applications using stream I/O and file I/O.

Instructions: Develop all program in C++

Assignments:

1.	Write a program to enter mark of 6 different subjects and find out the total mark (Using cin and cout statement)
2.	Write a function using reference variables as arguments to swap the values of pair of integers.
3.	Write a function to find largest of three numbers.
4.	Write a program to find the factorial of a number.
5.	Define a class to represent a bank account which includes the following members as Data members: a) Name of the depositor b) Account Number c) Withdrawal amount d) Balance amount in the account Member Functions: a) To assign initial values b)To deposit an amount c) To withdraw an amount after checking the balance d) To display name and balance.
6.	Write the above program for handling n number of account holders using array of objects.

7.	Write a C++ program to compute area of right angle triangle, equilateral triangle, isosceles triangle using function overloading concept.
8.	Consider a publishing company that markets both book and audio cassette version to its works. Create a class Publication that stores the title (a string) and price (type float) of a publication. Derive the following two classes from the above Publication class: Book which adds a page count (int) and Tape which adds a playing time in minutes(float). Each class should have get_data() function to get its data from the user at the keyboard. Write the main() function to test the Book and Tape classes by creating instances of the masking the user to fill in data with get_data() and then displaying it using put_data().
9.	Consider an example of declaring the examination result. Design three classes student, exam and result. The student has data members such as rollno, name. Create the class exam by inheriting the student class. The exam class adds data members representing the marks scored in 5 subjects. Derive the result from exam-class and it has own data members like total, avg.
10.	Write a program for overloading of Unary ++ operator.
11.	Write a program for overloading of Binary + operator.
12.	Write a program of Virtual Functions.
13.	Write a program of Abstract Classes.
14.	Write a program to read and write from file.

Reference Books:

1. Object Oriented Programming with C++, E. Balagurusami, Fourth Edition, Tata Mc-GrawHill.
 2. Object Oriented Programming in Turbo C++, Robert Lafore, Fourth Edition Galgotia Publications.
 3. The C++ Programming Language, Bjarna Stroustrup, Third Edition, Addison-Wesley Publishing Company.
 4. Object Oriented Programming Using C++, Salaria, R.S, Fourth Edition, Khanna Book Publishing.
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25C2CCU-215

Operating Systems Laboratory

Program: B Sc	L:0 T:0 P:4
Branch: Cyber Security	Credits: 2
Semester: 2nd	Contact hours: 4 hours per week
Theory/Practical: Practical	Percentage of numerical/design problems: 100
Internal max. marks: 60	Duration of end semester exam (ESE): 3hrs
External max. marks: 40	Elective status: Core
Total marks: 100	

Prerequisite: -

NA- Co

requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes: After going through the practical, student will be able to:

CO#	Course Outcomes
CO1	explain the fundamental operating system concepts including Windows and Linux operating system.
CO2	develop programs to simulate memory allocation strategies and virtual memory management.
CO3	apply various file system-related operations such as file creation, deletion, read, write using file management techniques
CO4	evaluate the performance of operating system components.

Instructions:

1	Installation of windows OS.
2	Installation of Linux OS.
3	Dual boot installation of Operating systems.
4	Implementation of FCFS Scheduling algorithm
5	Implementation of SJF Scheduling algorithm
6	Implementation of Round-Robin Scheduling algorithm
7	Vi Editor & its commands
8	Shell Commands
9	Shell Scripting- Using variables
10	Shell Scripting- Input & Output
11	Shell Scripting- Data types
12	Shell Scripting- Use of arithmetic operators
13	Shell Scripting- if control statement programs
14	Shell Scripting- while control statement
15	Shell Scripting- for control statement

Reference Books:

- i. Linux: The complete reference by Richard Petersen,
Published by Tata McGraw- Hill Publication.
- ii. Operating System Principles by Abraham Silberschatz and
Peter Baer Galvin, Seventh Edition, Published by Wiley-India.

25C2CSU-211
Fundamentals of Cyber Security Lab

Program: B. Sc. Cyber Security	L: 0 T: 0 P:4
Branch: Computer Applications	Credits: 2
Semester: 2nd	Contact hours: 4 hours per week
Theory/Practical: Practical	Percentage of numerical/design problems: 100%
Internal max. marks: 60	Duration of end semester exam (ESE): 3hrs
External max. marks: 40	Elective status: Core
Total marks: 100	

Prerequisite: -NA-

Co requisite: -NA-

Additional material required in ESE: -NA-

Course Outcomes:

CO#	Course outcomes
CO1	illustrate various security policies.
CO2	explain the concepts of firewalls, including their role in network security.
CO3	demonstrate an understanding of potential security risks and countermeasures to protect against unauthorized data capture.
CO4	develop programs to implement encryption and decryption techniques using Ceaser Cipher and Substitution Cipher algorithms effectively.

Experiments:

1. Write a program in C/Java to perform encryption and decryption using the following algorithms
 - a) Ceaser Cipher
 - b) Substitution Cipher
2. Demonstrate creation of Digital signatures using GNUPG.
3. Demonstrate the concept of firewalls.
4. Install Wireshark and different filters for network monitoring.
5. Install the key loggers to understand their working.

25C2CCU-201

Environmental Studies

Course Code	Course Outcomes
CO1	explain various concepts used in environmental studies.
CO2	relate the basic phenomenon of structure and functions of eco-system.
CO3	develop the understanding of conventional and non-conventional energy sources, solid waste management and technologies for sustainable development.
CO4	interpret the concept of bio-diversity and its conservation.
CO5	explain the impact of pollution leading to climate change and environmental disasters.
CO6	identify the role of citizen in prevention and safety from pollutants.

UNIT-1: Introduction to Environmental Studies

Multidisciplinary nature of Environmental Studies: Scope & Importance
Need for Public Awareness

UNIT-2: Ecosystems

Concept of an Ecosystem: Structure & functions of an ecosystem (Producers, Consumers & Decomposers)

Energy Flow in an ecosystem: Food Chain, Food web and Ecological Pyramids
Characteristic features, structure & functions of following Ecosystems:

- Forest Ecosystem
- Aquatic Ecosystem (Ponds, Lakes, River & Ocean)

UNIT-3: Natural Resources

Renewable & Non-renewable resources

Forest Resources: Their uses, functions & values (Biodiversity conservation, role in climate change, medicines) & threats (Overexploitation, Deforestation, Timber extraction, Agriculture Pressure), Forest Conservation Act

Water Resources: Their uses (Agriculture, Domestic & Industrial), functions & values, Overexploitation and Pollution of Ground & Surface water resources (Case study of Punjab), Water Conservation, Rainwater Harvesting,

Land Resources: Land as a resource; Land degradation, soil erosion and desertification

Energy Resources: Renewable & non-renewable energy resources, use of alternate energy resources (Solar, Wind, Biomass, Thermal), Urban problems related to Energy

UNIT-4: Biodiversity & its conservation

Types of Biodiversity: Species, Genetic & Ecosystem

India as a mega biodiversity nation, Biodiversity hot spots and biogeographic regions of India

Examples of Endangered & Endemic species of India, Red data book

UNIT-5: Environmental Pollution & Social Issues

Types, Causes, Effects & Control of Air, Water, Soil & Noise Pollution
Nuclear hazards and accidents & Health risks
Global Climate Change: Global warming, Ozone depletion, Acid rain, Melting of Glaciers & Ice caps, Rising sea levels

Environmental disasters: Earthquakes, Floods, Cyclones, Landslides

UNIT-6: Field Work

Visit to a National Park, Biosphere Reserve, Wildlife Sanctuary Documentation & preparation of a Biodiversity (flora & fauna) register of campus/river/forest

Visit to a local polluted site: Urban/Rural/Industrial/Agricultural

Identification & Photography of resident or migratory birds, insects (butterflies) Public hearing on environmental issues in a village

Suggested Books:

1. Bharucha, E. Text Book for Environmental Studies. University Grants Commission, NewDelhi.
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd.Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc.480p
5. Clark R.S., Marine Pollution, Clanderson Press Oxford(TB)
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai,1196p
7. De A.K., Environmental Chemistry, Wiley EasternLtd.
8. Down to Earth, Centre for Science and Environment(R)
9. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
10. Hawkins R.E., Encyclopedia of Indian Natural History, BombayNatural History Society, Bombay(R)
11. Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press1140p.
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14. Mhaskar A.K., Matter Hazardous, Techno-Science Publication(TB)
15. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co.(TB)
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17. Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBHPubl. Co. Pvt. Ltd. 345p.
18. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House,Meerut
19. Survey of the Environment, The Hindu(M)
20. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
21. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno- Science Publication(TB)

25C2CCU-211

Guidelines regarding Mentoring and Professional Development

The objective of mentoring will be development of:

- Overall Personality
- Aptitude (Technical and General)
- General Awareness (Current Affairs and GK)
- Communication Skills
- Presentation Skills

Course Outcomes:

Course Code	Course Outcomes
CO1	apply communication skills in today's workplace to facilitate ability to work collaboratively.
CO2	outline the understanding of effective group discussion and interview etiquettes.
CO3	identify the different techniques of communication.
CO4	explain various elements of group dynamics, team building activity and cooperation.
CO5	develop leadership qualities for fostering creativity and collaboration.

The course shall be split in two sections i.e. outdoor activities and class activities. For achieving the above, suggestive list of activities to be conducted are:

Part – A (Class Activities)

1. Expert and video lectures
2. Aptitude Test
3. Group Discussion
4. Quiz(General/Technical)
5. Presentations by the students
6. Team building Exercises

Part – B (Outdoor Activities)

1. Sports/NSS/NCC
2. Society Activities of various students chapter i.e. ISTE, SCIE, SAE, CSI, Cultural Club,etc.

Evaluation shall be based on rubrics for Part – A & B

Mentors/Faculty in charges shall maintain proper record student wise of each activity conducted and the same shall be submitted to the department.

3rd Semester

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-301	Computer Networks	Core Theory	4	3	1	0	40	60	100

Prerequisite: Basic Computer Knowledge

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Describe basic data communication concepts and network types.
CO2	Apply OSI and TCP/IP models with data link layer techniques.
CO3	Analyze MAC protocols, IEEE standards, and routing algorithms.
CO4	Evaluate transport layer functions and TCP/UDP protocols.
CO5	Design applications using session, presentation, and application layer services.

Detailed Syllabus

Unit-I Data communications concepts: Digital and analog transmissions Modem, parallel and serial transmission, synchronous and asynchronous communication. Modes of communication: Simplex, half duplex, full duplex. Types of Networks: LAN, MAN, WAN Network Topologies: Bus, Star, Ring, Mesh, Tree, Hybrid Communication Channels: Wired transmissions: Telephone lines, leased lines, switch line, coaxial cables- baseband, broadband, optical fiber transmission, Communication Switching .

(10 hrs)

Unit-II Network Reference Models: OSI Reference Model, TCP/IP Reference Model, Comparison of OSI and TCP/IP Reference Models. Transmission impairments – Attenuation, Distortion, Noise. Multiplexing – Frequency division, Time division, Wavelength division. Data Link Layer Design Issues: Services provided to the Network Layer, Framing, Error Control (error detection and correction code), Flow Control, Data Link Layer in the Internet (SLIP, PPP), Block Cipher Principles, Data Encryption Standard (DES).

(10 hrs)

Unit-III MAC sublayer: CSMA/CD/CA, IEEE standards (IEEE 802.3 Ethernet, Gigabit Ethernet, IEEE 802.4 Token Bus, IEEE 802.5 Token Ring) Network Layer: Design Issues, Routing Algorithms: Optimality Principle, Shortest Path Routing, Congestion Control Policies, Leaky bucket and token bucket algorithm, Concept of Internetworking.

(10 hrs)

Unit-IV Transport Layer: Design issues, Elements of transport protocols– Addressing, Connection establishment and release, Flow control and buffering, Introduction to TCP/UDP protocols.

(10 hrs)

Unit-V Session, Presentation and Application Layers: Session Layer– Design issues, remote procedure call. Presentation Layer– Design issues, Data compression techniques, Cryptography. Application Layer– Distributed application (client/server, peer to peer, cloud etc.), World Wide Web (WWW), Domain Name System (DNS), Email, File Transfer Protocol (FTP), HTTP as an application layer protocol.

(10 hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Computer Networks	Andrew S. Tanenbaum, David J. Wetherall	Pearson Education	3rd (2024)
2	Data Communications and Networking	Behrouz A. Forouzan	McGraw-Hill Education	5th (2013)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Larry L. Peterson, Bruce S. Davie	Larry L. Peterson, Bruce S. Davie	Morgan Kaufmann	1st (2009)
2	Cryptography and Network Security	William Stallings	Pearson Education	5th (2013)

Course Code	Course Name	Course Type	C d	L	T	P	Marks		
							Internal	External	Total
25C2CSU-304	Ethical Hacking	Core Theory	3	3	0	0	40	60	100

Pre-requisite: Basic knowledge of Computer Networks and Operating Systems.

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Explain ethical hacking concepts, security threats, vulnerabilities and phases of hacking.
CO2	Apply reconnaissance and foot printing techniques to gather information about target systems.
CO3	Explore network scanning techniques to identify live systems, open ports and running services.
CO4	Evaluate system hacking methods including password cracking, sniffing and spoofing techniques.
CO5	Interpret wireless network security measures against WEP attacks and traffic sniffing threats.

Detailed Syllabus

Unit 1 Introduction: Understanding the importance of security, concept of ethical hacking, types of hackers, essential terminologies – Threat, Attack, Vulnerability, Target of Evaluation, Exploit, phases involved in hacking, overview of cyber security practices and ethical issues in hacking.

(10 Hrs)

Unit 2: Foot printing: Introduction to foot printing, understanding information gathering methodology used by hackers, DNS concepts, Authoritative and Non-Authoritative replies by DNS, reconnaissance techniques, passive and active information gathering methods, tools used during reconnaissance phase.

(10 Hrs)

Unit 3: Scanning: Detecting live systems on target networks, discovering services running/listening on target systems, understanding port scanning techniques, identifying TCP and UDP services running on target systems, active and passive fingerprinting techniques, basics of network mapping and enumeration.

(10 Hrs)

Unit 4: System Hacking: Aspects of remote password guessing, role of eavesdropping, methods of password cracking, keystroke loggers, understanding sniffers, active and passive sniffing, ARP spoofing and redirection, DNS and IP sniffing, HTTPS sniffing and related countermeasures.

(10 Hrs)

Unit 5: Wireless Network Security: Fundamentals of wireless networks, wireless security standards, WEP attacks, WPA and WPA2 security mechanisms, wireless traffic sniffing techniques, wireless authentication methods, securing wireless networks against attacks, prevention techniques and wireless security best practices.

(10 Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Network Security and Ethical Hacking	,Rajat Khare	Luniver Press	2016
2	Ethical Hacking	Thomas Mathew	OSB Publisher	2023

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1.	Network Security Secrets & Solutions	Stuart McClure, Joel Scambray and George Kurtz,	McGraw-Hill	7 th edition, 2012
2.	Network Security Essentials: Applications and Standards	William Stallings	Pearson Education	7 th edition, 2017

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-305	Mathematical Foundations for Cryptography	Core Theory	4	3	1	2	40	60	100

Pre-requisite: Basic Mathematics and Discrete Mathematics.

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Describe the fundamental concepts of number theory, including divisibility, division algorithm, Euclidean algorithm, and prime numbers.
CO2	Explain the concepts of linear congruences, properties of congruences, modular inverses, Fermat's theorem, Euler's totient function and Euler's theorem.
CO3	Apply the principles of pseudorandom, true random number generation and perform binary arithmetic and bitwise operations in computational problems.
CO4	Analyze random number generation, bitwise operations and cryptographic techniques to identify security threats and vulnerabilities.
CO5	Evaluate the application of number theory, finite fields and random number generation in cryptographic algorithms along with analyzing security risks in cryptographic implementations.

Detailed Syllabus

Unit 1: Introduction to Number Theory: Divisibility, Division Algorithm, Euclidean Algorithm, Greatest Common Divisor, Extended Euclidean Algorithm, Modular Arithmetic, Linear Congruence, Properties of Congruences, Modular Inverses, Prime Numbers, Fermat's Theorem, Euler's Totient Function, Euler's Theorem, Primality Testing, Miller-Rabin Algorithm, Chinese Remainder Theorem, Discrete Logarithms

(10 Hrs)

Unit 2: Finite Fields: Algebraic Structures, Groups, Abelian Groups, Cyclic Groups, Rings, Fields, Finite Fields $GF(p)$, Multiplicative Inverse in $GF(p)$, Polynomial Arithmetic over Z_p , GCD in Polynomial Arithmetic, Finite Fields $GF(2^n)$, Modular Polynomial Arithmetic, Generator in Finite Fields

(10 Hrs)

Unit 3: Random Number Generation & Bitwise Operations: Principles of Pseudorandom Number Generation, Pseudorandom Number Generators, True Random Number Generators, Binary Arithmetic, Bitwise AND, OR, XOR, Complement, Shift Left, Shift Right

(10 Hrs)

Unit 4: Random Number Generation and Bitwise Operations

Cryptology, Cryptography, Cryptanalysis, Confidentiality, Privacy, Threat, Attack, Incident, Intrusion, Malware, Countermeasure, Asset, Vulnerability, Risk, Risk Mitigation, Cipher, Key, Symmetric Encryption, Asymmetric Encryption, Substitution Ciphers, Transposition Ciphers, Block Ciphers, Stream Ciphers

(10 Hrs)

Unit 5: Applications of Cryptographic Techniques

Application of Number Theory in Cryptography, Application of Finite Fields in Cryptographic Algorithms, Role of Random Number Generation in Security Systems, Mathematical Foundation of Symmetric and Asymmetric Encryption, Security Risk Analysis in Cryptographic Implementations

(10 Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Cryptography & Network Security	Atul Kahate	Mc Graw Hill.	4th edition, 2019
2	An introduction to mathematical Cryptography	Jeffrey Hoffstein, Jill Pipher	Joseph H., Springer	2nd edition, 2014

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Modern Cryptography: Applied Mathematics for Encryption and Information Security	William Easttom	Springer	2nd edition, 2022

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-302	Data Structures	Core Theory	4	3	1	0	40	60	100

Pre-requisite: Basic knowledge of C Programming.

Course Outcomes:

At the end of the course the student will be able to	
CO1	Explain basic data structure concepts with arrays, pointers and strings.
CO2	Apply the algorithm complexity and stack and queue operations for solving computational problems.
CO3	Classify linked lists, structures and their operations for dynamic data management.
CO4	Examine tree and graph structures along with traversal and shortest path techniques.
CO5	Develop algorithms and programs of searching, sorting, and hashing techniques for efficient data organization and retrieval.

Detailed Syllabus

Unit 1: Introduction to Data Structures:

Algorithms and Flowcharts, Basics Analysis on Algorithm, Complexity of Algorithm, Introduction and Definition of Data Structure, Classification of Data, Arrays, Various types of Data Structure, Static and Dynamic Memory Allocation, Function, Recursion.

Arrays, Pointers and Strings: Introduction to Arrays, Definition, One Dimensional Array and Multi-Dimensional Arrays, Pointer, Pointer to Structure, various Programs for Array and Pointer. Strings. Introduction to Strings, Definition, Library Functions of Strings.

(10 Hrs)

Unit 2: Stacks and Queue

Introduction to Stack, Definition, Stack Implementation, Operations of Stack, Applications of Stack and Multiple Stacks. Implementation of Multiple StackQueues, Introduction to Queue, Definition, Queue Implementation, Operations of Queue, Circular Queue, De-queue and Priority Queue.

(10 Hrs)

Unit 3: Linked Lists

Introduction, Representation and Operations of Linked Lists, Singly Linked List, Doubly Linked List, Circular Linked List, And Circular Doubly Linked List.

(10 Hrs)

Unit 4 : Trees and Graphs

Introduction to Tree, Tree Terminology Binary Tree, Binary Search Tree, Strictly Binary Tree, Complete Binary Tree, Tree Traversal, Threaded Binary Tree, AVL Tree B Tree, B+ Tree.

Graphs, Searching, Sorting and Hashing Graphs: Introduction, Representation to Graphs, Graph Traversals Shortest Path Algorithms.

(10 Hrs)

Unit 5: Searching, Sorting and Hashing: Searching, Types of Searching, Sorting, Quick Sort, Bubble Sort, Merge Sort, Selection Sort, Hash Function, Types of Hash Functions, Collision, Collision Resolution Techniques, Perfect Hashing

(10 Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Data Structures and Algorithms Implementation through C	Brijesh Bakariya.	BPB Publications	Latest Edition
2	Data Structures and Program Design in C;	Kruse R. L.	PHI	Latest Edition

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1.	Fundamentals of Data Structures,	Horowitz & Sawhaney:	Galgotia Publishers	Latest Edition
2	Understanding Pointers in C	Yashwant Kanetkar,	BPB Publications	Latest Edition

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-304	Ethical Hacking	Core Theory	3	3	0	0	40	60	100

Pre-requisite: Basic knowledge of Computer Networks and Operating Systems.

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Explain ethical hacking concepts, security threats, vulnerabilities and phases of hacking.
CO2	Apply reconnaissance and foot printing techniques to gather information about target systems.
CO3	Explore network scanning techniques to identify live systems, open ports and running services.
CO4	Evaluate system hacking methods including password cracking, sniffing and spoofing techniques.
CO5	Interpret wireless network security measures against WEP attacks and traffic sniffing threats.

Detailed Syllabus

Unit 1 Introduction: Understanding the importance of security, Concept of ethical hacking and essential Terminologies-Threat, Attack, Vulnerabilities, Target of Evaluation, Exploit. Phases involved in hacking.

(10 Hrs)

Unit 2: Foot printing: Authoritative, Non -Auth reply by DNS, Introduction to foot printing, Understanding the information gathering methodology of the hackers, Tools used for the reconnaissance phase.

(10 Hrs)

Unit 3: Scanning: Detecting live systems on the target network, Discovering services running /listening on target systems, Understanding port scanning techniques, Identifying TCP and UDP services running on the target network, Understanding active and passive fingerprinting.

(10 Hrs)

Unit 4 : System Hacking: Aspect of remote password guessing, Role of eavesdropping, Various methods of password cracking, Keystroke Loggers, Understanding Sniffers ,Comprehending Active and Passive Sniffing, ARP Spoofing and Redirection, DNS and IP Sniffing, HTTPS Sniffing.

(10 Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Network Security and Ethical Hacking	Rajat Khare	Luniver Press	2006
2	Ethical Hacking	Thomas Mathew	OSB Publisher	2003

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1.	Network Security Secrets & Solutions	Stuart McClure, Joel Scambray and George Kurtz,	McGraw-Hill	7 th edition, 2012

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-311	Computer Networking Laboratory	Core Practical/ Laboratory	1	0	0	2	60	40	100

Pre-requisite: Basic knowledge of Computer Networks.

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Identify networking devices, transmission media, cabling techniques and LAN topologies.
CO2	Demonstrate the configuration of TCP/IP protocols and dynamic IP addressing in Windows and Linux environments.
CO3	Implement network design concepts including classful addressing, subnetting and resource sharing.
CO4	Test network connectivity and troubleshoot problems using networking commands and server configurations.
CO5	Develop networking programs and utilize simulation tools for analyzing network communication.

Detailed Syllabus

No.	Assignment Description
1	Familiarization with networking components and devices: LAN Adapters, Hubs, Switches, Routers etc.
2	Familiarization with transmission media and tools: Coaxial cable, UTP cable, Crimping tool, Connectors etc.
3	Preparing straight and cross cables
4	Study of various LAN topologies and their creation using network devices, cables and computers
5	Configuration of TCP/IP Protocols in Windows and Linux
6	Implementation of resource sharing (file, printer etc.)
7	Designing and implementing class A, B and C networks
8	Subnet planning and its implementation
9	To configure dynamic IP address for a computer connected to a LAN
10	Use of commands like ping, ipconfig for troubleshooting network related problems
11	Develop a program to compute the Hamming Distance between any two code words
12	Installation of FTP server and client
13	To configure proxy server
14	Familiarization with network simulation tools.

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-312	Data Structure Laboratory	Core Practical/ Laboratory	2	0	0	4	60	40	100

Pre-requisite: Basic knowledge of C Programming.

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Explain dynamic memory allocation, arrays, matrices and string manipulation techniques through C programs.
CO2	Make use of searching and sorting algorithms to organize and retrieve data efficiently.
CO3	Implement stack and queue data structures using arrays and pointers for problem solving.
CO4	Test linked list and tree operations for efficient dynamic data management.
CO5	Develop graph traversal programs using BFS and DFS algorithms.

Detailed Syllabus

No.	Assignment Description
1	Program for using Dynamic Functions (malloc(), calloc(), realloc() and free()) functions.
2	Program to insert, delete and traverse an element from an array
3	Program to merge one dimensional arrays
4	Program for addition and subtraction of two matrices.
5	Program for implementing multiplication of two matrices
6	Implement linear search using one and two dimensional array.
7	Program for implementing selection sort.
8	Program for implementing insertion sort.
9	Program for implementing quick sort.
10	Program for implementing merge sort.
11	Program to calculate length of the string using user defined function.
12	Program to concatenate and compare two strings using user defined function.
13	Program for using the concept of pointer to string.
14	Program to reverse a sentence by recursion.
15	Program to delete all repeated words in string.
16	Program to find the number of vowels, consonants, digits and white space in a string.
17	Program to find the length of the longest repeating sequence in a string.
18	Program to find highest and lowest frequency character in a string.
19	Program for implementing Stack using array.
20	Program for implementing Stack using pointer.
21	Program for implementing multiple stack.
22	Program for converting infix to postfix form.
23	Program for implementing Queue using array.
24	Program for dynamic implementation of queue.
25	Program for implementing circular queue.

26	Program for implementing dequeue.
27	Program for implementing priority queue.
28	Program for implementing Singly Linked list.
29	Program for implementing Doubly Linked list.
30	Program for implementing Binary Search Tree.
31	Program for Breadth First Search(BFS) for graph traversal.
32	Program for Depth First Search(DFS) for graph traversal.

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-303	Programming in Python	Core Theory	3	3	1	0	40	60	100

Pre-requisite: Basic knowledge of Computers and Programming concepts.

Course Outcomes:

	At the end of the course the student will be able to:
CO1	Describe Python programming fundamentals, environment setup and core language features.
CO2	Apply control structures and Python data types to develop problem-solving programs.
CO3	Analyze functions, modules and packages for modular program development.
CO4	Develop programs by using exception handling mechanisms and file operations for reliable execution.
CO5	Explain object-oriented programming concepts using classes and objects in Python.

Detailed Syllabus

Unit 1: Introduction to Python Programming Language: Programming Language, History and Origin of Python Language, Features of Python, Limitations, Major Applications of Python, Getting, Installing Python, Setting up Path and Environment Variables, Running Python, First Python Program, Python Interactive Help Feature, Python differences from other languages.

(10 Hrs)

Unit 2: Control Structures: Decision making statements, Python loops, Python control statements.

Python Native Data Types: Numbers, Lists, Tuples, Sets, Dictionary, Functions & Methods of Dictionary, Strings (in detail with their methods and operations).

(10 Hrs)

Unit 3: Python Functions: Functions, Advantages of Functions, Built-in Functions, User defined functions, Anonymous functions, Pass by value Vs. Pass by Reference, Recursion, Scope and Lifetime of Variables.

Python Modules: Module definition, Need of modules, Creating a module, Importing module, Path Searching of a Module, Module Reloading, Standard Modules, Python Packages.

(10 Hrs)

Unit 4: Exception Handling: Exceptions, Built-in exceptions, Exception handling, User defined exceptions in Python.

File Management in Python: Operations on files (opening, modes, attributes, encoding, closing), read() & write() methods, tell() & seek() methods, renaming & deleting files in Python, directories in Python.

(10 Hrs)

Unit 5: Classes and Objects: The concept of OOPS in Python, Designing classes, Creating objects, Accessing attributes, Editing class attributes, Built-in class attributes, Garbage collection, Destroying objects.

(10 Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Programming in Python	Pooja Sharma	BPB Publications	2017
2	Core Python Programming	R. Nageswara Rao	Dreamtech	2 nd Edition

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	The complete Reference	Martin C. Brown	Mc Graw Hill Education	1st Edition (2001)
2	Python in a Nutshell	A. Martelli, A. Ravenscroft	OREILLY	3rd Edition (2017)

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-313	Programming in Python Lab	Core Practical/Laboratory	1	0	0	2	30	20	50

Prerequisite: -Basic knowledge of Programming in Python.

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Describe basic Python programming concepts through arithmetic, mathematical and control structure programs.
CO2	Apply Python constructs to solve problems involving loops, series, matrices and numerical computations.
CO3	Implement string, list and dictionary operations for data processing applications.
CO4	Experiment with user-defined functions, recursion techniques for modular programming solutions.
CO5	Develop object-oriented programs and file handling applications using Python.

Detailed Syllabus

S. No.	Activities
1	Compute sum, subtraction, multiplication, division and exponent of given variables input by the user.
2	Compute area of following shapes: circle, rectangle, triangle, square, trapezoid and parallelogram.
3	Compute volume of following 3D shapes: cube, cylinder, cone and sphere.
4	Compute and print roots of quadratic equation $ax^2+bx+c=0$, where the values of a, b, and c are input by the user.
5	Print numbers up to N which are not divisible by 3, 6, 9,, e.g., 1, 2, 4, 5, 7,....
6	Write a program to determine whether a triangle is isosceles or not?
7	Print multiplication table of a number input by the user.
8	Compute sum of natural numbers from one to n number.
9	Print Fibonacci series up to n numbers e.g. 0 1 1 2 3 5 8 13.....n
10	Compute factorial of a given number.
11	Count occurrence of a digit 5 in a given integer number input by the user.
12	Print Geometric and Harmonic means of a series input by the user.
13	Evaluate the following expressions: a. $x-x^2/2!+x^3/3!-x^4/4!+\dots x^n/n!$ b. $x-x^3/3!+x^5/5!-x^7/7!+\dots x^n/n!$
14	Print all possible combinations of 4, 5, and 6.
15	Determine prime numbers within a specific range.
16	Count number of persons of age above 60 and below 90.
17	Compute transpose of a matrix.

18.	Perform following operations on two matrices. 1) Addition 2) Subtraction 3) Multiplication
19.	Count occurrence of vowels.
20.	Count total number of vowels in a word.
21.	Determine whether a string is palindrome or not.
22.	Perform following operations on a list of numbers: 1) Insert an element 2) delete an element 3) sort the list 4) delete entire list
23.	Display word after Sorting in alphabetical order.
24.	Perform sequential search on a list of given numbers.
25.	Perform sequential search on ordered list of given numbers.
26.	Maintain practical note book as per their serial numbers in library using Python dictionary.
27.	Perform following operations on dictionary 1) Insert 2) delete 3) change
28.	Check whether a number is in a given range using functions.
29.	Write a Python function that accepts a string and calculates number of upper case letters and lower case letters available in that string.
30.	To find the Max of three numbers using functions.
31.	Multiply all the numbers in a list using functions.
32.	Solve the Fibonacci sequence using recursion.
33.	Get the factorial of a non-negative integer using recursion.
34.	Write a program to create a module of factorial in Python.
35.	Design a Python class named <i>Rectangle</i> , constructed by a length & width, also design a method which will compute the area of a rectangle.
36.	Design a Python class named <i>Circle</i> constructed by a radius and two methods which will compute the area and the perimeter of a circle.
37.	Design a Python class to reverse a string 'word by word'.
38.	Write a Python program to read an entire <i>text file</i> .
39.	Design a Python program to read first n lines of a <i>text file</i> .
40.	Construct a Python program to write and append text to a file and display the text.

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-314	Skill Enhancement Course	Career and Placement Planning - 1	1	0	0	2	50	-	50

Pre-requisite: Basic understanding of C

Course Outcomes:

	At the end of the course the student will be able to:
CO1	explain the structure of C++ programs, programming fundamentals, data types, operators, and input/output operations.
CO2	apply decision-making and looping constructs to develop basic C++ programs.
CO3	develop modular programs using functions, recursion, and arrays in C++.
CO4	construct object-oriented programs using classes, objects, constructors, and member functions.
CO5	analyze the use of pointers, reference variables, and dynamic memory allocation in C++ programs.

Detailed Syllabus

Unit 1: Fundamentals of C++

Introduction to programming and object-oriented programming concepts, structure of a C++ program, tokens, keywords, identifiers, data types, variables, constants, operators, type casting, and input/output using `cin` and `cout`.

(5 Hrs)

Unit 2: Control Structures

Decision-making statements (`if`, `if-else`, `switch`), looping constructs (`for`, `while`, `do-while`), nested loops, break and continue statements, and logical problem-solving exercises.

(5 Hrs)

Unit 3: Functions and Arrays: Function declaration and definition, call by value and call by reference, inline functions, default arguments, function overloading, recursion basics, one-dimensional and two-dimensional arrays, and passing arrays to functions.

(5 Hrs)

Unit 4: Classes and Objects

Concept of classes and objects, access specifiers, member functions, array of objects, constructors (default and parameterized), copy constructor, destructor, static data members, `const` keyword, and friend functions.

(6 Hrs)

Unit 5: Pointers and Memory Management Pointer fundamentals, pointer arithmetic, pointers with arrays and objects, dynamic memory allocation using `new` and `delete`, reference variables, pointer to functions, and practical problem-solving using pointers.

(5Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Data Structures using C/C++	TPP Dept.	TPP	6th Edition (2025)
2	Object Oriented Programming In C++	Balaguruswami, E.	Tata McGraw-Hill	8 th Edition, (2020)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	The C++ Programming Language	Bjarne Stroustrup	Pearson Education	4th Edition (2013)
2	An Introduction to Object-Oriented Application Development	Richard Johnson	Thomson Learning	1 st Edition, (2007)

Course Code	Course Type	Course Title	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-315	Value Added Course(NCC)	MOOC	0	0	0	2	-	-	S/US

Course Outcomes:

Defined by the online platform for the specific course chosen.

The Departmental committee shall select a MOOC available on any reputed platform. However, the selected MOOC should not be similar to the regular courses offered as a part of the department curriculum.
course

The overall monitoring of the MOOC course will be under the supervision of the teacher In-charge of the department. The Departmental Academic Committee shall assess the student work based on the relevant course completion certificate.

S= Satisfactory

US=Unsatisfactory

4TH Semester

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	Final Exam	Total
25C2CSU-401	Database Management System	Core Theory	4	3	1	0	40	60	100

Pre-requisite: Basic knowledge of Computer Fundamentals and Programming.

Course Outcomes:

At the end of the course the student will be able to	
CO1	Describe the fundamental concepts and components of Database Management Systems (DBMS).
CO2	Build and execute queries for database creation, manipulation, and retrieval by using SQL commands.
CO3	Apply cursors, stored procedures and stored functions to implement database operations and improve query processing in PL/SQL.
CO4	Analyze database schemas using normalization techniques to identify functional, multivalued and join dependencies.
CO5	Explain database recovery mechanisms and concurrency control techniques to ensure data consistency and reliability in database systems.

Detailed Syllabus

Unit 1: Introduction to DBMS, Data Modeling for a Database, Three Level Architecture of DBMS, Components of a DBMS, Introduction to Data Models, Hierarchical Model, Network Model, Relational Model, Comparison of Network, Hierarchical and Relational Model, Entity Relationship Model.

(10 Hrs)

Unit2: Relational Database, Relational Algebra and Calculus, SQL Fundamentals, **DDL Commands:** Create, Alter, Drop, Truncate, Rename, **DML Commands:** Insert, Select, Update, Delete, **TCL Commands:** Commit, Rollback, Savepoint.

(10 Hrs)

Unit 3: PL/SQL Concepts, Cursors (implicit and explicit for row-by-row query processing.), Stored Procedures, Stored Functions, Database Triggers and their types (BEFORE, AFTER, INSTEAD OF), and their role in enforcing business rules and maintaining data integrity.

(10 Hrs)

Unit 4: Introduction to Normalization, First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF), Dependency Preservation, Boyce-Codd Normal Form (BCNF), Multi-valued Dependencies and Fourth Normal Form (4NF), Join Dependencies and Fifth Normal Form (5NF), Domain-Key Normal Form (DKNF).

(10 Hrs)

Unit 5: Database Recovery, Concurrency Management, Database Security, Integrity and Control, Structure of Distributed Databases, Design of Distributed Databases.

(10 Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Database System Concepts	Korth, Silberchatz	Mcgraw Hill Education	7th (2019)
2	Fundamentals of Database Systems	Ramez Elmasri, Shamkant B. Navathe	Pearson Education	7th Edition (2016)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Fundamentals of Database System	ElmasriRame, Navathe Shamkant	Pearson Education	7th (2015)
2	An Introduction to Database Systems	C. J. Date	Pearson Education	8th Edition (2003)

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	Final Exam	Total
25C2CSU-402	Network Security	Core Theory	4	3	1	0	40	60	100

Pre-requisite: Basic knowledge of Computer Networks and Cryptography.

Course Outcomes

At the end of the course the student will be able to:	
CO1	Identify security threats using suitable security systems.
CO2	Analyze messages using encryption and decryption techniques.
CO3	Decide the use of hashing techniques in creating digital signatures and certificates to ensure data integrity.
CO4	Evaluate the application of cryptographic systems in the design and implementation of security mechanisms such as IPSec and firewalls.
CO5	Design secure network solutions by integrating security mechanisms such as intrusion detection systems (IDS), VPNs, and wireless security protocols.

Detailed Syllabus

Unit 1:

Network Security Terminology: Identification, Confidentiality, Authentication, Authorization, Access Control, Integrity, Non-Repudiation, Freshness, and Availability, Network Threats and Types of attacks, Introduction to malwares.

(10 Hrs)

Unit 2: Cryptography Symmetric Cipher Model, Classical Cryptographic Algorithms: Monoalphabetic Substitutions such as Caesar Cipher, Cryptanalysis of Monoalphabetic ciphers; Transposition Cipher. Stream and Block Ciphers Block cipher: principles, Data Encryption Standard (DES), Concept of Asymmetric Cryptography, Rivets-Shamir-Adleman (RSA) Key Generation, Encryption and Decryption Algorithm.

Key Management Protocols: Solving Symmetric Key Distribution Problem, Diffie-Hellman Algorithm, Key Exchange with Public Key Cryptography or Asymmetric Cryptography, Digital Envelope,PublicKeyCertificateStructure,CertificateAuthority

(10 Hrs)

Unit 3: Hash Algorithms & Digital Signature Hash concept, Hash Function Requirements, Popular Message Digest and Hash Algorithms: Overview of SHA1, SHA2, MD4, MD5, Digital Signature. Authentication Protocols Basic authentication protocols, concept of Key distribution centre (KDC), Needham-Schroeder Authentication Protocol.

(10 Hrs)

Unit 4: SSL and TLS, Overview of IP Security, Introduction to Firewalls and IDS.

(10 Hrs)

Unit 5: Virtual Private Networks (VPN) and Tunneling Techniques. Wireless Network Security: WEP, WPA, WPA2. Intrusion Prevention Systems (IPS). Security Policies, Network Monitoring and Incident Response. Overview of Emerging Trends in Network Security.

(10 Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Network Security Essentials: Applications and Standards	William Stallings	Pearson Education	7th (2017)
2	Cryptography and Network Security: Principles and Practice	William Stallings	Pearson Education	8th (2023)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Network Security: Private Communication in a Public World	Charlie Kaufman, Radia Perlman, Mike Speciner	Pearson Education	2nd (2002)
2	Computer Security: Principles and Practice	William Stallings, Lawrie Brown	Pearson Education	4th (2018)

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	Final Exam	Total
25C2CSU-404	Digital Forensics	Core Theory	3	3	0	0	40	60	100

Pre-requisite: Basic knowledge of Computer Networks and Operating Systems.

Course Outcomes

At the end of the course the student will be able to	
CO1	Describe the fundamental concepts and role of forensic science and cyber-criminalistics in the digital investigation process.
CO2	Explain the procedures involved in cyber crime scene analysis and unretrieved communications in a criminal investigation.
CO3	Analyze the process and outcomes of digital forensic investigations by examining collected evidence and critiquing completed forensic cases.
CO4	Analyze mobile forensic techniques and tools for extracting and preserving digital evidence.
CO5	Evaluate digital forensic tools, investigation processes, documentation practices and emerging forensic technologies to effectively analyze and present digital evidence in cybercrime investigations.

Detailed Syllabus

Unit 1:

Digital Forensics Science: Forensics science, computer forensics, and digital forensics.

Computer Crime: Criminalistics as it relates to the investigative process, analysis of cyber-criminalistics area, holistic approach to cyber- forensics.

(10 Hrs)

Unit2:

Cyber Crime Scene Analysis: Discussion on court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation.

Evidence Management & Presentation: Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Explain what the normal case would look like, Define who should be notified of a crime, parts of gathering evidence, Define and apply probable cause.

(10 Hrs)

Unit 3: Computer Forensics: Prepare a case, Begin an investigation, Understand computer forensics workstations and software, Conduct an investigation, Complete a case, Critique a case,

Network Forensics: open-source security tools for network forensic analysis, requirements for preservation of network data.

(10 Hrs)

Unit 4: Mobile Forensics: mobile forensics techniques, mobile forensics tools. Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008. Recent trends in mobile forensic technique and methods to search and seizure electronic evidence

(10 Hrs)

Unit 5: Digital Forensic Tools: Overview of popular forensic tools such as EnCase, FTK, Autopsy, and Sleuth Kit.

Forensic Investigation Process: Evidence acquisition, disk imaging, data recovery, and analysis techniques.

Forensic Documentation and Reporting: Preparing forensic reports, maintaining chain of custody, presenting digital evidence in court.

Emerging Trends in Digital Forensics: Cloud forensics, IoT forensics, and challenges in modern cybercrime investigations.

(10 Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Digital Forensics and Incident Response	Kevin Mandia, Matthew Pepe, Jason Luttgens	McGraw-Hill Education	2nd (2014)
2	Guide to Computer Forensics and Investigations	Bill Nelson, Amelia Phillips, Christopher Steuart	Cengage Learning	6th (2019)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Computer Forensics: Principles and Practices	Linda Volonino, Reynaldo Anzaldua	Pearson	1st (2008)
2	Network Forensics: Tracking Hackers through Cyberspace	Sherri Davidoff, Jonathan Ham	Prentice Hall	1st (2012)

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	Final Exam	Total
25C2CSU-405	Cyber Laws and IPR	Core Theory	2	0	0	4	60	40	100

Pre-requisite: Basic knowledge of Cyber Security and Computer Fundamentals.

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Illustrate statutory, regulatory, constitutional, and organizational laws that affect information technology professionals.
CO2	Apply the concepts of case law and common law to analyze current legal dilemmas in the technology field.
CO3	Analyze the primary forms of intellectual property rights and their significance in the technology domain.
CO4	Classify different forms of intellectual property protection by comparing their key differences and similarities.
CO5	Explain the strategies or recommendations to address the societal impact of intellectual property rights.

Detailed Syllabus

Unit 1: Introduction : Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level, Jurisdictional Aspects in Cyber Law Issues of jurisdiction in cyberspace, Types of jurisdiction, Minimum Contacts Theory, Sliding Scale Theory, Effects Test and International targeting, Jurisdiction under IT Act, 2000.

(10 Hrs)

Unit 2 :Cyber Crimes& Legal Framework

Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Ethics and Etiquettes of Cyber World, Cyber Pornography, Identity Theft & Fraud, Cyber Terrorism, Cyber Defamation, Right to Privacy and Data Protection on Internet, Concept of privacy, Threat to privacy on internet, Self-regulation approach to privacy.

(10 Hrs)

Unit 3: Overview of Intellectual Property

introduction and the need for intellectual property right (IPR), IPR in India – Genesis and Development IPR in abroad, Data Protection, Open Source Software, Macro economic impact of the patent system, Patent and kind of inventions protected by a patent, Patent document How to protect your inventions?, Granting of patent, Rights of a patent

(10 Hrs)

Unit 4: Copyright, Related Rights and Trademarks

What is copyright? Latest editions of Designs, what is covered by copyright? How long does copyright last? Why protect copyright? What are related rights?, Distinction between related rights and copyright?, What is a trademark? Rights of trademark?, What kind of signs can be used as trademarks?, types of trademark, function does a trademark perform, How is a trademark protected? How is a trademark registered?

(10 Hrs)

Unit 5: Intellectual Property Rights Enforcement:

Infringement of Intellectual Property Rights, Remedies for infringement, Civil and Criminal remedies under IPR laws.

International Framework for IPR:

Overview of international treaties and organizations such as the World Intellectual Property Organization (WIPO), Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), and Berne Convention.

Societal and Economic Impact of IPR:

Role of IPR in innovation and economic development, impact of IPR on society, access to knowledge and technology, IPR challenges in the digital environment, software piracy and its consequences.

Emerging Issues in IPR: Digital Rights Management (DRM), protection of software and multimedia content, challenges of IPR in cyberspace.

(10 Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Cyber Law and Information Technology	Nandan Kamath	Universal Law Publishing	2nd (2018)
2	Cyber Law: The Indian Perspective	P. K. Pandey	Wiley India	1st (2013)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Cyber Law in India	Farooq Ahmad	New Era Law Publications	3rd (2016)
2	Intellectual Property Rights: Unleashing the Knowledge Economy	Prabuddha Ganguli	McGraw Hill Education	2nd (2011)

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	Final Exam	Total
25C2CSU-411	Database Management Systems Lab	Core Practical/Laboratory	2	0	0	4	60	40	100

Prerequisite: -Basic knowledge of Database Management Systems.

Course Outcomes

At the end of the course the student will be able to	
CO1	Make use of the basic SQL commands and database concepts, including DDL, DML and simple SELECT queries.
CO2	Implement SQL queries, aggregate functions, substring comparison, ordering of results and nested queries in relational databases.
CO3	Apply SQL queries and operations on relational schemas such as Library and Order databases to retrieve, manipulate and manage data effectively.
CO4	Analyze database requirements to design complex queries, views, and table partitioning and interpret results obtained from multi-table operations and joins.
CO5	Develop PL/SQL programs, triggers, and procedural blocks to automate database operations such as arithmetic calculations, row counting and salary updates.

Detailed Syllabus

Lab Activities for Database Lab

S. No.	Activities
1	Used of CREATE, ALTER, RENAME and DROP statement in the database tables (relations)
2	Used of INSERT INTO, DELETE and UPDATE statement in the database tables (relations)
3	Use of simple select statements.
4	Use of select query on two relations
5	Use of nesting of queries.
6	Use of aggregate functions.
7	Use of substring comparison.
8	Use of order by statement.

9	Consider the following schema for a Library Database: BOOK (Book_id, Title, Publisher_Name, Pub_Year) BOOK_AUTHORS (Book_id, Author_Name) PUBLISHER (Name, Address, Phone) BOOK_COPIES (Book_id, Branch_id, No-of_Copies) BOOK_LENDING (Book_id, Branch_id, Card_No, Date_Out, Due_Date) LIBRARY_BRANCH (Branch_id, Branch_Name, Address) Write SQL queries to 1. Retrieve details of all books in the library_id, title, name of publisher, authors, number of copies in each branch, etc. 2. Get the particulars of borrowers who have borrowed more than 3 books between Jan 2018 to Jun 2018 3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation. 4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query. 5. Create a view of all books and its number of copies that are currently available in the Library.
10	Consider the following schema for Order Database: SALESMAN (Salesman_id, Name, City, Commission) CUSTOMER (Customer_id, Cust_Name, City, Grade, Salesman_id) ORDERS (Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id) Write SQL queries to 1. Count the customers with grades above Amritsar's average. 2. Find the name and numbers of all salesmen who had more than one customer. 3. List all salesmen and indicate those who have and don't have customers in their cities (Use UNION operation.) 4. Create a view that finds the salesman who has the customer with the highest order of a day. 5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.
11	Write a PL/SQL code to add two numbers and display the result. Read the numbers during run time.
12	Write a PL/SQL code to find sum of first 10 natural numbers using while and for loop.
13	Write a program to create a trigger which will convert the name of a student to upper case before inserting or updating the name column of student table.
14	Write a PL/SQL block to count the number of rows affected by an update statement using SQL%ROWCOUNT
15	Write a PL/SQL block to increase the salary of all doctors by 1000.

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-403	Web Technologies	Skill Enhancement Course-I	3	3	0	0	40	60	100

Pre-requisite: Basic knowledge of Internet and Programming concepts.

Course Outcomes:

At the end of the course the student will be able to	
CO1	Illustrate the basic HTML tags and their usage in creating simple web pages.
CO2	Apply HTML techniques to design web pages with multiple sections or frames.
CO3	Make use of methods for navigating web pages using hypertext and image links for linking web pages.
CO4	Use key web design concepts and their implementation using JavaScript.
CO5	Design interactive web forms with special controls using HTML.

Detailed Syllabus

Unit-I

Internet Basics Basic concepts, communicating on the internet, internet domains, internet server identities, establishing connectivity on the internet client IP address. Introduction To HTML Information Files Creation, Web Server, Web Client/Browser, Hyper Text Markup Language (HTML Tags, Paired Tags, Singular Tags), Commonly Used Html Commands (Document Head, Document Body), Title and Footer, Text Formatting (Paragraph Breaks, Line Breaks), Emphasizing Material in a Web Page (Heading Styles, Drawing Lines). Basic Formatting Tags HTML Basic Tags, Text Formatting (Paragraph Breaks, Line Breaks), Emphasizing Material in a Web Page (Heading Styles, Drawing Lines), Text Styles (Bold, Italics, Underline), Other Text Effects (Centering (Text, Images etc.), Spacing (Indenting Text), HTML Color Coding.

(10 hrs)

Unit-II

Lists Type of Lists (Unordered List (Bullets), Ordered Lists (Numbering), Definition Lists. Adding Graphics To Html Documents Using The Border Attribute, Using The Width And Height Attribute, Using The Align Attribute, Using The Alt Attribute. Tables Introduction (Header, Data rows, The Caption Tag), Using the Width and Border Attribute, Using the Cell padding Attribute, Using the Cell spacing Attribute, Using the BGCOLOR Attribute, Using the COLSPAN and ROWSPAN Attributes. Introduction to Frames: The tag, The tag, Targeting Named Frames. DHTML: Cascading Style Sheets, Style Tag.

(10 hrs)

Unit-III

Linking Documents Links (External Document References, Internal Document References), Image As Hyperlinks.

(10 hrs)

Unit-IV: Forms Used by a Web Site The Form Object, The Form Object's Methods (The Text Element, The Password Element, The Button Element, The Submit (Button) Element, The Reset (Button) Element, The Checkbox Element, The Radio Element, The Text Area Element, The Select and Option Element, The Multi Choice Select Lists Element).

(10 hrs)

UnitV: Introduction to JavaScript JS Introduction, Where To, Output, Statements, Syntax, Comments, Variables, Operators, Arithmetic, Assignment, Data Types, Functions, Objects, Events, Strings, String Methods, Numbers, Number Methods, Arrays, Array Methods, Array Sort, Array Iteration, Dates, Date Formats, Date Get Methods, Date Set Methods, Math, Random, Booleans, Comparisons, Conditions, Switch, Loop For, Loop While, Break, Type Conversion, Bitwise, RegExp, Errors, Scope, Hoisting, Strict Mode, JSON, Forms, Forms API [CO5] JS Functions, Function Definitions, Function Parameters, Function Invocation, Function Call, Function Apply, Function Closures

(10 hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Web Programming with HTML5, CSS and JavaScript	John Dean	Jones & Bartlett Learning	2nd (2018)
2	HTML and CSS: Design and Build Websites	Jon Duckett	Wiley	1st (2011)

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	JavaScript and JQuery: Interactive Front-End Web Development	Jon Duckett	Wiley	1st (2014)
2	Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics	Jennifer Niederst Robbins	O'Reilly Media	5th (2018)

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-413	Web Technologies Laboratory	Skill Enhancement Course-Laboratory	1	0	0	2	30	20	50

Prerequisite: Basic knowledge of Web Technology.

Course Outcomes:

At the end of the course the student will be able to:	
CO1	Design pages with simple text formatting tags in HTML.
CO2	Create web pages by embedding Audio and Video content.
CO3	Develop the web pages with internal and external linking.
CO4	Implement advanced web designing concepts using java script.
CO5	Create web pages complex programs to solve real world problems.

Instructions: Instructors can increase/decrease the experiments as per the requirement.

1. Create a simple HTML page to demonstrate the use of different tags.
2. Design index page of a book on web designing.
3. Display Letter Head of your college on a web page.
4. Create a Hyperlink to move around within a single page rather than to load another page.
5. Display letter using different Text formatting Tags.
6. Design Time Table of your department and highlights of most important periods.
7. Use Tables to provide layout to your web page.
8. Embed Audio and Video into your web page.
9. Divide a web page vertically and horizontally and display logo of your college in left pane and logo of university in right pane.
10. Create a student Bio- Data.
11. Design front page of hospital with different style sheets.
12. Design a web page and display two different pages at a time.
13. Write a program to create a login form. On submitting the form, the user should get navigated to a profile page using JavaScript.
14. Write a code to create a Registration Form. On submitting the form, the usershould be asked to login with the new credentials using JavaScript.

15. Write an HTML code to create your Institute website/Department website/ Tutorial website for specific subject.
Also use Java Script for validation

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-412	Network Security Lab	Core Practical/ Laboratory	1	0	0	2	60	40	100

Prerequisite: Basic knowledge of Network Security and Computer Networks.

Course Outcomes

At the end of the course the student will be able to:	
CO1	Illustrate real-time security systems used for identifying and detecting security threats.
CO2	Apply public and private cryptographic algorithms for encryption and decryption of messages.
CO3	Explore the use of cryptography and hashing techniques in generating digital signatures and certificates to ensure data integrity.
CO4	Classify the application of cryptographic systems in the design and implementation of security mechanisms such as IPSec and firewalls.
CO5	Design secure network solutions by integrating security mechanisms such as intrusion detection systems (IDS), VPNs, and wireless security protocols to protect modern networks.

Instructions: Instructors can increase/decrease the experiments as per the requirement.

1. Explain packet sniffer. Discuss its need. Explore from the Internet some popular packet sniffers. Wireshark is one such sniffer. Install Wireshark on your system. Explore its features and sniff various packets from your machine and enter into your machine. Identify the type of protocols of these packets. Connect to the PTU's website and find HTTP, TCP, IP and data link layer headers. Take snapshot of header fields, values and payloads of the packets being exchanged between your machine and PTU's website.
2. Implement the DES algorithm. Display all substitution and transposition outputs.
3. Implement the concept of digital envelope using socket programming.
4. Write a program to implement the RSA algorithm.
5. Explore various hash functions. Use these hash functions to generate digital signatures on different length messages.
6. Install a packet sniffer on your machine. Visit any https website. Take snapshots of TCP headers of all phases of SSL/TLS protocol. Demonstrate and explain working of SSL/TLS protocol with the help of snapshots.

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-414	Skill Enhancement Course	Career and Placement Planning - 2	1	0	0	2	50	-	50

Pre-requisite: Basic knowledge of arithmetic operations, elementary mathematics and fundamental logical reasoning skills required for problem solving and analytical thinking..

Course Outcomes:

	At the end of the course the student will be able to:
CO1	analyze numerical and logical patterns to identify sequences and determine missing elements in pattern-based problems.
CO2	apply percentage concepts and analytical skills to interpret and solve problems based on numerical data and graphical representations.
CO3	examine relational information to determine family relationships and solve logical reasoning problems accurately.
CO4	make use of mathematical formulas and reasoning to solve problems involving financial calculations and comparative interest scenarios.
CO5	evaluate quantitative relationships and financial situations to solve problems involving inequalities and profit-loss calculations.

Detailed Syllabus

Unit 1: Series: - Introduction to Series, Different Types of Series, Identifying Patterns, Finding Missing Terms, Logical based series.

(3 Hrs)

Unit 2: Percentage & Data Interpretation: - Introduction to the concept of Percentage, Calculating Percentages, Fractions, Change in Percentage, Successive Change, Problems based on Percentage. Introduction to Data Interpretation and its types (Bar Graphs, Pie Charts, Line Graph, Missing DI's, Tabular DI, Interpreting, Analyzing and Data Calculations

(9 Hrs)

Unit 3: Blood Relations: - Introduction to Blood Relations, Family Relationships, Marriage & Siblings Relationships, Coded Blood Relations, Statement based problems.

(3 Hrs)

Unit 4: Simple Interest & Compound Interest: - Introduction to concept of Simple Interest. Calculating Simple Interest, Problems based on Simple Interest, Introduction to concept of Compound Interest, Comparison of Simple and Compound Interest, Calculate Difference of Simple and Compound Interest, Based on Various Rates (Annually, Half Yearly, Quarterly)

(5 Hrs)

Unit 5: Inequalities & Profit and Loss – Introduction to the concept of inequalities, Types of inequalities (Linear, Quadratic). Finding Roots and Comparison of Roots. Introduction to the concept of Profit & Loss, About Various Terminologies (CP, SP, MP, Listed Price, MRP, Profit%, Loss%, Mark up, Discount), Successive Profit and Loss, Concept of Dishonest Dealer/False Weight, Application and Problems based on Profit Loss.

(6Hrs)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Quantitative Aptitude for Competitive Examinations by R.S. Aggarwal	R.S. Aggarwal	S Chand and Company Ltd	Latest Edition-2025
2	A Modern Approach to Verbal & Non-Verbal Reasoning by R.S. Aggarwal	R.S. Aggarwal	S. Chand Publishing	2026 Revised Edition-2025

Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Quantitative Aptitude & Logical Reasoning	TPP Department	TPP	6 th Edition
2	Fast Track Objective Arithmetic by Rajesh Verma (Arihant)	Rajesh Verma	Arihant Publications (India) Ltd	Latest Edition-2025-2026

Course Code	Course Type	Course Title	Cd	L	T	P	Marks		
							Internal	External	Total
25C2CSU-415	Value Added Course (NCC)	MOOC	0	0	0	2	-	-	S/US

Course Outcomes:

Defined by the online platform for the specific course chosen.

The Departmental committee shall select a MOOC available on any reputed platform. However, the selected MOOC should not be similar to the regular courses offered as a part of the department curriculum.
course

The overall monitoring of the MOOC course will be under the supervision of the teacher In-charge of the department. The Departmental Academic Committee shall assess the student work based on the relevant course completion certificate.

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