DEPARTMENT OF COMPUTER APPLICATIONS, SMIT, MAJITAR

SYLLABUS FOR BCA (CLOUD TECHNOLOGY AND INFORMATION SECURITY) COURSE CURRICULUM

Total Credits:
23+23+23+23+24+24=140

(2016-2017 BATCH)

Course Objective

This unique course provides dual career options for the students in the fast growing technology sectors of Cloud Technology and Information Security. In addition to all the mandatory subjects of a traditional BCA, this specialized course offers in-depth practical know-how of the current trend Technology – Cloud and Information Security. These sectors have the potential to grow exponentially and they provide challenging job opportunities for young professionals with the right skill sets.

On the Cloud Technology front, the course will provide students with the fundamental knowledge of all aspects of Cloud Technology. The course focuses on Virtualization Technology, Cloud Technology, Datacenters, Networking and Operating Systems. On the Information Security front, this course equips the students with the concepts and the technical skills in Information Security. The focus of the course is on the models, tools and techniques for enforcement of Security Policies, with emphasis on Cryptography, Ethical Hacking, Computer Forensics and Virtualization and Cloud Security.

DEPARTMENT OF COMPUTER APPLICATIONS

1ST SEMESTER					
SL. NO.	**CODE**	**SUBJECT NAME**	**Subject Type #**	**Subject (T/P)**	**Credit**
1	CA1111	COMMUNICATION SKILLS	CORE	T	3
2	CA1112	ENGLISH	CORE	T	4
3	CA1113	FUNDAMENTALS OF MATHEMATICS	CORE	T	4
4	CA1114	COMPUTER FUNDAMENTALS & ORGANIZATION	CORE	T	4
5	CA1115	PROGRAMMING IN C	CORE	T	3
6	CA1116	INTRODUCTION TO LINUX	CORE	T	3
7	CA1166	C-PROGRAMMING LAB	CORE	P	1
8	CA1167	INTRODUCTION TO LINUX -LAB	CORE	P	1
				Total credits for the semester	**23**

II ND SEMESTER					
SL.NO.	**CODE**	**SUBJECT NAME**	**Subject Type #**	**Subject (T/P)**	**Credit**
1	CA1211	REASONING AND THINKING -I	CORE	T	3
2	CA1212	ENGLISH – II	CORE	T	4
3	CA1213	FUNDAMENTAL OF STORAGE MANAGEMENT	CORE	T	4
4	CA1214	OPERATING SYSTEM	CORE	T	4
5	CA1215	OOPS WITH C++	CORE	T	3
6	CA1216	DATA STRUCTURES USING C	CORE	T	3
7	CA1266	OOPS WITH C++ - LAB	CORE	P	1
8	CA1267	DATA STRUCTURE USING C - LAB	CORE	P	1
				Total credits for the semester	**23**

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(External Member)

Prof. (Dr.) Nabarun Bhattacharya
Associate Director, C-DAC, Kolkata
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III RD SEMESTER					
SL. NO.	**CODE**	**SUBJECT NAME**	**Subject Type #**	**Subject (T/P)**	**Credit**
1	CA1311	INTRODUCTION TO PUBLIC SPEAKING	CORE	T	3
2	CA1312	INFORMATION SECURITY FUNDAMENTALS	CORE	T	4
3	CA1313	SOFTWARE ENGINEERING	CORE	T	4
4	CA1314	RDBMS	CORE	T	3
5	CA1315	COMPUTER NETWORKS	CORE	T	4
6	CA1316	PROGRAMMING IN JAVA	CORE	T	3
7	CA1366	RDBMS - LAB	CORE	P	1
8	CA1367	PROGRAMMING IN JAVA - LAB	CORE	P	1
				Total credits for the semester	**23**

IV TH SEMESTER					
SL. NO.	**CODE**	**SUBJECT NAME**	**Subject Type #**	**Subject (T/P)**	**Credit**
1	CA1411	EMPLOYABILITY SKILLS	CORE	T	3
2	CA1412	INSTALLATION AND CONFIGURATION OF SERVER	CORE	T	3
3	CA1413	ETHICAL HACKING FUNDAMENTALS	CORE	T	3
4	CA1414	CRYPTOGRAPHY FUNDAMENTALS	CORE	T	4
5	CA1415	INTRODUCTION TO CLOUD TECHNOLOGY	CORE	T	4
6	CA1416	FUNDAMENTALS OF DATA CENTER	CORE	T	4
7	CA1466	ETHICAL HACKING FUNDAMENTALS-LAB	CORE	P	1
8	CA1467	INSTALLATION AND CONFIGURATION OF SERVER-LAB	CORE	P	1
				Total credits for the semester	**23**

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V TH SEMESTER					
SL. NO.	**CODE**	**SUBJECT NAME**	**Subject Type #**	**Subject (T/P)**	**Credit**
1	CA1511	COMPUTER FORENSICS AND INVESTIGATION	CORE	T	3
2	CA15**	ELECTIVE-I	ELECTIVE	T	4
3	CA1512	IT GOVERNANCE,RISK & INFO SEC MANAGEMENT	CORE	T	4
4	CA1513	LINUX ADMINISTRATION	CORE	T	4
5	CA1514	INTRODUCTION TO CLOUD COMPUTING SOLUTION	CORE	T	4
6	CA1515	PRINCIPLES OF VIRTUALIZATION	CORE	T	3
7	CA1566	COMPUTER FORENSICS AND INVESTIGATION -LAB	CORE	P	1
8	CA1567	PRINCIPLES OF VIRTUALIZATION - LAB	CORE	P	1
Total credits for the semester					**24**

LIST OF ELECTIVES FOR BCA (V SEMESTER)				
SL. NO.	**CODE**	**SUBJECT NAME**	**Subject Type #**	**Subject (T/P)**
1	CA1551	VIRTUALIZATION AND CLOUD SECURITY	ELECTIVE	T
2	CA1552	PROFESSIONAL SKILLS	ELECTIVE	T
3	CA1553	BUSINESS ORGANISATION BASICS	ELECTIVE	T

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DEPARTMENT OF COMPUTER APPLICATIONS

VI TH SEMESTER					
SL. NO.	**CODE**	**SUBJECT NAME**	**Subject Type #**	**Subject (T/P)**	**Credit**
1	CA16**	ELECTIVE-II	Elective	T	4
2	CA1672	PROJECT & VIVA-VOCE	PROJECT	P	20
				Total credits for the semester	**24**

LIST OF ELECTIVES FOR BCA (VI SEMESTER)				
SL.NO.	**CODE**	**SUBJECT NAME**	**Subject Type #**	**Subject (T/P)**
1	CA1651	MOBILE , WIRELESS AND VOI SECURITY	ELECTIVE	T
2	CA1652	REASONING AND THINKING - II	ELECTIVE	T
3	CA1653	ITIL	ELECTIVE	T

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CA1111 **(3L hrs./week)**

COMMUNICATION SKILLS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: This course aims at improving the communications skills of the students, which is a very significant factor for their success in professional career. With the advent of global presence in corporate, it has become a necessity that we communicate effectively and accurately with everyone, to get across our ideas to them.

Pre-requisites: None

Unit - I

Communication in Business [5hrs]
Role of Communication in Business - Main forms of Communication in Business - Communication process - Coding and decoding - Roots of misunderstanding - Inferential model - Original message and reconstructed message.

Communication Symbols [5hrs]
Symbols mismatch implications -Non-verbal symbols - Verbal symbols.

Common communication challenges [5hrs]
Seven communication roadblocks - Communicating across cultures.

Managerial Writing [5hrs]
7cs of written communication-Business letters - Stationery - Format and layout -E-mail - Managing the mailbox - Presenting mail – Common sense and etiquette.

Unit - II

Report Writing [5hrs]
Parts of a report - Qualities of a good report - Improving writing skills,

Memos & Notices [5hrs]
Internal communication through memos, minutes, notices & reports.

Sample Business Letters I [5hrs]
Types of Business letters - routine letters, bad news and persuading letters, sales letters, Inquiries, Circulars, Quotations, Orders, Acknowledgments, Executions, Complaints, Claims & Adjustments, collection letters, job application letters.

Sample Business Letters II [5hrs]
Curriculum Vitae / Resume -Invitation to interview - Offer of employment - Letter of acceptance - Letter of resignation -Recommendation letter, Logical Traps.

Reference Books:

1. Matthukutty M Monippally, Business Communication Strategies, Tata McGraw-Hill.
2. Chaturvedi P.D. et al, Business Communication; Concepts, Cases, & Applications, Pearson Education.
3. Shirley Taylor, Communication for Business, Pearson Education.
4. Lesiicar and Flatley, BasicBusiness Communication, Tata McGraw-Hill.
5. Courtan L. Bovee et al., Business Communication Today, Pearson Education.

CA1112 **(4L hrs/week)**

ENGLISH

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: This course introduces to the students, the beauty of English, through some of the wonderful short stories / Essays by well-known authors. Basic Grammar skills are also taught.
Pre-requisites: None

Unit - I

Essay / Short Story [22 Hrs]

1.	Toasted English	R.K.Narayan
2.	Gift of the Magi	O'Henry
3.	On Education	Einstein
4.	How to name a Dog	James Thurber
5.	The Subtle Art of Story Telling	Utpal Kumar Banerjee

Unit – II

Poetry / Grammar [20 Hrs]

1.	The World is too much with us	William Wordsworth
2.	La Belle DAME Sans Merci	John Keats
3.	Richard Cory	E.A.Robinson
4.	Brahma	Emerson
5.	A River	A.K.Ramanujan
6.	Nikki Rosa	Nikki Giovanni

Grammar [10 Hrs]

1. Vocabulary
2. Subject-Verb Agreement
3. Transformation of sentences(simple, complex and compound)

CA1113 **(4L hrs/week)**

FUNDAMENTALS OF MATHEMATICS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: To develop the skills in the areas of Matrices, Sets, relations and functions, Differentiation and Integration. To serve as a pre-requisite mathematics course for post graduate courses, specialized studies and research.

Pre-requisites: None

Unit-I

Matrices [6hrs]
Types of Matrices, Operations of addition, Scalar Multiplication and Multiplication of Matrices, Determinant of a Square Matrix, Minors and Cofactors, Transpose.

Adjoint and inverse of a matrix [4hrs]
Solving system of linear equations, in two or three variables using inverse of a matrix.

Sets, relations and Functions [6hrs]
Definition of Set, Type of Sets, Operations on Sets, Venn diagram, Cartesian Product, Relations, Functions, Types of function, some elementary functions with their graphs (Exponential, logarithmic, modulus), Limit & continuity of a function (Simple Problems).

Differentiation [10hrs]
Derivative and its meaning, Differentiation of algebraic, trigonometric, exponential & logarithmic functions, Rules of Differentiation, Differentiation by Substitution, Higher Order Differentiation, Maxima and Minima of Simple Functions

Unit-II

Integration [8hrs]
Integral as Anti-derivative process, Indefinite Integrals, Rules of Integration, Integration by substitution,

Definite Integration [6hrs]
Properties of Definite Integral, Finding areas of Simple Closed Curves

Coordinate Geometry [6hrs]
2D Cartesian Co-ordinate system, Straight line: (Equation & Slope of a line), Circle: Equation of Circle, Equation to Tangent,

Conic Sections [6hrs]
Focus, Eccentricity, Directrix, Axis of a conic section, Parabola & Ellipse: (Definitions, equations and shape of curve only)

Reference Books:

1. Mathematics for BCA by G. C. Sharma & Madhu Jain, Oscar Publication.
2. Mathematics Vol-2 by R. D. Sharma, Dhanpat Rai & Sons.
3. S. L. Loney, The Elements of Co-ordinate Geometry Part-I, Macmillan.

CA1114 **(4L hrs/week)**

COMPUTER FUNDAMENTALS & ORGANIZATION

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: The basic knowledge of how a computer works is very important for any fresh networking or operating system professional. The functional knowledge of a computers working and its main building parts are paramount. The computers of today may come with variety of features but the basic working principles remain the same. Students will explore the fundamentals of organization of a computer and the principles and building units of a computer (its hardware). Also, they will be introduced to the basics of networking and MS Office.

Pre-requisites: None

Unit -1

General Features of a Computer [6hrs]
General features of a computer, Generation of computers, Personal computer, workstation, mainframe computer and super computers. Computer applications – data processing, information processing, commercial, office automation, industry and engineering, healthcare, education, graphics and multimedia

Computer Organization [8hrs]
Computer organization, central processing unit, computer memory – primary memory and secondary memory.

Secondary storage devices [6hrs]
Magnetic and optical media. Input and output units. OMR, OCR, MICR, scanner, mouse, modem.

Computer Hardware and Software [6hrs]
Computer hardware and software. Machine language and high level language. Application software, computer program, operating system. Computer virus, antivirus and computer security. Elements of MS DOS and Windows OS.

Unit- II

Computer arithmetic [6hrs]
Binary, octal and hexadecimal number systems. Algorithm and flowcharts, illustrations, elements of a database and its applications .

Basic Gates [6hrs]
Demorgans theorems, duality theorem, NOR,NAND,XOR,XNOR gates, Boolean expressions and logic diagrams, Types of Boolean expressions.

MS Office [6hrs]
Word processing and electronic spread sheet. An overview of MSWORD, MSEXCEL and MSPOWERPOINT.

Introduction to Networking [8hrs]

Network of computers. Types of networks, LAN, Intranet and Internet. Internet applications. World Wide Web, E-mail, browsing and searching, search engines, multimedia applications.

Text Books:

1. B.Sivasankar , Engineering Chemistry‖ Tata McGraw-Hill .
2. B.K.Sharma, Engineering Chemistry‖, Krishna Prakasan Media (P) Ltd.

Reference Books:

1. P.C.Jain and Monica Jain, Engineering Chemistry, Dhanpat Rai Pub, Co.
2. S.S.Dara, A text book of Engineering Chemistry, S.Chand and Co.Ltd.
3. Puri and Sharma, A text book of Physical chemistry, Vishal Publication.

CA1115 **(3L hrs/week)**

PROGRAMMING IN C

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Even with the introduction of several high level languages and frameworks, the development of procedural codes is important in several commercial app developments. The object oriented platforms and event driven systems use procedural languages for coding integral command content. C is an important procedural language and was developed initially to write the UNIX operating system. UNIX operating system, C compiler and all UNIX application programs are written in C. C is popular because, it is easy to learn, produces efficient programs, can handle low-level activities, and can be compiled on a variety of platforms. This course focuses on all the basic concepts, syntax and constructs of the C language. For students, who are new to programming, this unit can be considered as the starting point before taking up any other programming oriented units. The students will be implementing the concepts explained here to create simple to complex programs.

Pre-requisites: None

Unit-I

Overview of programming [5hrs]
Introduction to computer based problem solving, Program design and implementation issues- Flowcharts & Algorithms, Top down design & stepwise refinement, Programming environment Machine language, assembly language, high level languages, Assemblers, Compilers, Interpreters.

Fundamentals of C programming [5hrs]
Overview of C, Data Types, Constants & Variables, Operators & Expressions, Control constructs-if then, for, while, Arrays- single & multidimensional arrays, Functions-fundamentals – general form, function arguments, return value, Basic I/O-formatted and Unformatted I/O.

Advanced features [5hrs]
Type modifiers and storage class specifies for data types, Bit operators, Operator, &operator, * operator, Type casting, type conversion.

Control constructs [**5hrs]**
Do while, Switch statement, break and continue, exit () function, go to and label, Scope rules- Local & global variables, scope rules of functions,

Unit-II

Functions [5hrs]
Parameter passing, call by value and call by reference, calling functions with arrays, argc and argv, recursion- basic concepts, ex-towers of Hanoi

Pointers [5hrs]
The & and * operator, pointer expression, assignments, arithmetic, comparison, malloc vs calloc, arrays of pointers, pointers to pointers, initializing pointers, pointers to functions, function retuning pointers.

Structures [5hrs]
Basics, declaring, referencing structure elements, array of structures, passing structures to functions, structure pointers, arrays and structures within structures, Unions – Declaration, uses, enumerated data-types, typedef.

File Handling [5hrs]
The file pointer, file accessing functions, fopen, fclose, puc, getc, fprintf, C Preprocessor- #define, #include, #undef, Conditional compilation directives, C standard library and header files: Header files, string functions, mathematical functions, Date and Time functions.

Text Books:

1. E. Balagurusamy, Programming in ANSI C, Tata McGraw Hill.
2. Y. Kanetkar, "Let Us C", BPB Publication.

Reference Books:

1. Ashok N. Kamthane, "Programming with ANSI and Turbo C", Pearson Education.
2. B.S. Gottfried, "Programming with C", Tata McGraw Hill
3. Kernighan and Ritchie, "The C Programming", Pearson Education.
4. K. Venugopal, "Mastering C", Tata McGraw Hill.

CA1116 **(3L hrs/week)**

INTRODUCTION TO LINUX

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: The course provides an overview of the Linux Operating System, geared toward new users as an exploration tour and getting started guide. This unit provides examples to help the learners get a better understanding of the Linux system. The unit also provides the guidelines for the learners to take up vendor certifications. The unit explores the basics of Linux, the underlying management of the Linux operating system and its network configuration. The complete system services of Linux is explained along with the troubleshooting.

Pre-requisites: Basic knowledge of computer system like processor, memory and storage

Unit-1

Linux Introduction [6hrs]
Introduction to Multi user System, History of UNIX, Features & Benefits, Versions of UNIX, Features of UNIX File System, Commonly Used Commands like who, pwd, cd, mkdir, rm, rmdir, ls, mv, ln, chmod, cp, grep, sed, awk ,tr, yacc etc. getting Started (Login/Logout) . Creating and viewing files using cat, file comparisons, View files, disk related commands, checking disk free spaces.

Exploring Linux Flavors [6hrs]
Introduction to various Linux flavors. , Debian and rpm packages, Vendors providing DEBIAN & RPM distribution & Features. Ubuntu. History, Versions, Installation, Features, Ubuntu one. Fedora: History, Versions, Installation, Features.

The Unix File System [8hrs]
Inodes - Structure of a regular file – Directories - Conversion of a path name to an inode - Super block - Inode assignment to a new file - Allocation of disk blocks.

System calls for the file System [6hrs]
Open – Read - Write - Lseek – Close - File creation - Creation of special files - Changing directory and root - changing owner and mode – stat and fstat - pipes - Dup - Mounting and Un mounting file systems - Link and Un link.

Unit- II

UNIX Process Management [6hrs]
The Structure of Processes: Process States and Transitions - Layout of system memory - Context of a process. Process Control: Process Creation – Signals – Process Termination – Invoking other programs – PID & PPID – Shell on a Shell.

VI editor [8hrs]
Vi Editor: Introduction to Text Processing, Command & edit Mode, Invoking vi, deleting & inserting Line, Deleting & Replacing Character, Searching for Strings, Yanking, Running Shell Command

Macros, Set Window, Set Auto Indent, Set No. Communicating with Other Users: who, mail, wall, send, mesg, ftp.

System Administration -I [6hrs]
Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes,

System Administration –II [6hrs]
Temporary disabling of user's accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with name, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command

Reference Books:

1. Maurice J. Bach, The Design of Unix Operating System, Pearson Education.
2. S. Prata, Advance UNIX, a Programmer's Guide, , BPB Publications.
3. B.W. Kernighan & R. Pike, The UNIX Programming Environment, PHI.
4. Jack Dent Tony Gaddis, Guide to UNIX Using LINUX, Thomson Pub.

CA1166 **(1.5P hrs/week)**

C PROGRAMMING – LAB

List of Programs

Part A

1 Printing the reverse of an integer.
2 Printing the odd and even series of N numbers.
3 Get a string and convert the lowercase to uppercase and vice--versa using getchar() and putchar().
4 Input a string and find the number of each of the vowels appear in the string.
5 Accept N words and make it as a sentence by inserting blank spaces and a full stop at the end.
6 Printing the reverse of a string.

Part B

1 Searching an element in an array using pointers.
2 Checking whether the given matrix is an identity matrix or not.
3 Finding the first N terms of Fibonacci series.
4 Declare 3 pointer variables to store a character, a character string and an integer respectively. Input values into these variables. Display the address and the contents of each variable.
5 Define a structure with three members and display the same.
6 Declare a union with three members of type integer, char, string and illustrate the use of union.
7 Recursive program to find the factorial of an integer.
8 Finding the maximum of 4 numbers by defining a macro for the maximum of two numbers.
9 Arranging N numbers in ascending and in descending order using bubble sort.
10 Addition and subtraction of two matrices.
11 Multiplication of two matrices.
12 Converting a hexadecimal number into its binary equivalent.
13 Check whether the given string is a palindrome or not.
14 Demonstration of bitwise operations.
15 Applying binary search to a set of N numbers by using a function.
16 Create a sequential file with three fields: empno, empname, empbasic. Print all the details in a neat format by adding 500 to their basic salary.

CA1167 **(1.5P hrs/week)**

INTRODUCTION TO LINUX – LAB

List of Programs

1. Execute 25 basic commands of UNIX.
2. Basics of functionality and modes of VI Editor.
3. WAP that accepts user name and reports if user is logged in.
4. WAP which displays the following menu and executes the option selected by user:
   1. ls 2. Pwd 3. ls –l 4. ps –fe
5. WAP to print 10 9 8 7 6 5 4 3 2 1 .
6. WAP that replaces all "*.txt" file names with "*.txt.old" in the current.
7. WAP that echoes itself to stdout, but backwards.
8. WAP that takes a filename as input and checks if it is executable, if not make it executable.
9. WAP to take string as command line argument and reverse it.
10. 1. Create a data file called employee in the format given below:

a. EmpCode Character
b. EmpName Character
c. Grade Character
d. Years of experience Numeric
e. Basic Pay Numeric

$vi employee

A001	ARJUN	E1	01	12000.00
A006	Anand	E1	01	12450.00
A010	Rajesh	E2	03	14500.00
A002	Mohan	E2	02	13000.00
A005	John	E2	01	14500.00
A009	Denial Smith	E2	04	17500.00
A004	Williams	E1	01	12000.00

Perform the following functions on the file:

a. Sort the file on Emp Code.
b.Sort the file on
   (i) Decreasing order of basic pay
   (ii) Increasing order of years of experience.
c. Display the number of employees whose details are included in the file.
d. Display all records with 'smith' a part of employee name.
e. Display all records with EmpName starting with 'B'.
f. Display the records on Employees whose grade is E2 and have work experience of 2 to 5 years.
g.Store in 'file 1' the names of all employees whose basic pay is between 10000 and 15000.
h.Display records of all employees who are not in grade E2.

CA1211 **(3L hrs/week)**

REASONING AND THINKING (PART I)

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: This course covers some basic things of verbal ability, some topics of quantitative aptitude and idea of logical reasoning. It will help students in placements.

Pre-requisites: Knowledge of basic formulas

Unit- I

Verbal ability [10 hrs]
Synonyms, Antonyms and One word substitutes
Basic quantitative aptitude [10 hrs]
Speed, Time and Distance, Time and Work, Linear Equations, Progressions (Sequences & Series), Permutation and Combination, Probability, Functions, Set Theory, Number Systems, LCM and HCF, Percentages,
Collection and Scrutiny of data [10 hrs]
Primary data, questionnaire and schedule; secondary data, their major sources including some government publications.

Unit -II

Logical Reasoning – I [9 hrs]
Number and Letter Series, Calendars, Clocks, Cubes, Venn Diagrams, Binary Logic, Seating Arrangement, Logical Sequence, Logical Matching, Logical Connectives, Syllogism

Reference Books:

1. Richard I Levin, David S. Rubin, Statistics for Management, PHI.
2. Bajpai, N. Business Statistics, Pearson.
3. Sharma J.K., Business Statistics, Pearson.
4. Anderson; David R, Dennis J. Sweeney and Thomas A. Williams, Quantitative Methods for Business, PHI.

CA1212 **(4Lhrs/week)**

ENGLISH –II

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: This course introduces to the students, the beauty of English, through some of the wonderful short stories / Essays by well-known authors. Basic Grammar skills are also taught.
Pre-requisites: None

Unit - I

Essay / Short Story [22 Hrs]

1. Sermons in cats	Aldous Huxley
2. Sporting Spirit	George Orwell
3. Pepe	Maxim Gorky
4. The Key	A.E.W.Mason
5. The Child	Premchand
6. Wife of a Hero	A.J. Cronin

Unit – II

Poetry / Grammar [20 Hrs]

1. God's Granduer	G.M. Hopkins
2. Ode to a skylark	P.B.Shelley
3. Aging	Maya Angelou
4. Elephant	D.H.Lawrence
5. The Journey of the Magi	T.S.Eliot
6. The Second Coming	W.B.Yeats
7. The Unknown Citizen	W.H. Auden

Grammar [10 Hrs]

1. Active and passive voice
2. Direct and Indirect speech
3. Framing Questions
4. Correction of Errors

CA1213 **(4L hrs/week)**

FUNDAMENTALS OF STORAGE MANAGEMENT

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Data is all around us, in different forms and amounts. As we are steeping into revolutionizing world of advanced computing like cloud computing, data storage has also undergone many transformations in terms of techniques and hardware used for the same. This makes it significant for a computer student to learn different aspects of data storage. In this course, students will learn fundamentals of data storage, covering topics like demands on data, how storage techniques have evolved over a period of time and vital information about storage topologies like DAS, NAS and SAN, along with their comparison features. The second unit deals with different hardware required for storage like adapters, connectors, cables and their individual features. Different storage protocols used like ATA, SATA, SPI and its sub-categories will be taught to students in the following units. Topics storage security and storage infrastructure are addressed in the final unit.

Pre-requisites: None

Unit-1

Introduction to Information storage [6hrs]
Information Storage: Data – Types of Data –Information - Storage , Evolution of Storage Technology and Architecture, Data Center Infrastructure - Core elements- Key Requirements for Data Center Elements .

Management of information Storage [6hrs]
Managing Storage Infrastructure, Key Challenges in Managing Information, Information Lifecycle - Information Lifecycle Management - ILM Implementation -ILM Benefits.

Storage System Environment [7hrs]
Components of a Storage System Environment – Host –Connectivity – Storage, Disk Drive Components –Platter – Spindle - Read/Write Head - Actuator Arm Assembly - Controller - Physical Disk Structure - Zoned Bit Recording - Logical Block Addressing.

Performance of Storage [7hrs]
Disk Drive Performance -1 Disk Service Time , Fundamental Laws Governing Disk Performance , Logical Components of the Host - Operating System - Device Driver -Volume Manager - File System – Application , Application Requirements and Disk Performance.

Unit-II

Backup and Recovery [5hrs]
Backup Purpose -Disaster Recovery - Operational Backup –Archival, Backup Considerations, Backup Granularity, Recovery Considerations, Backup Methods, Backup Process, Backup and Restore Operations.

Backup Topologies [3hrs]

Serverless Backup, Backup Technologies -Backup to Tape - Physical Tape Library - Backup to Disk - Virtual Tape Library .

Local Replication [10hrs]

Source and Target -Uses of Local Replicas, Data Consistency - Consistency of a Replicated File System - Consistency of a Replicated Database , Local Replication Technologies - Host-Based Local Replication - Storage Array-Based Replication , Res tore and Restart Considerations - Tracking Changes to Source and Target , Creating Multiple Replicas, Management Interface.

Managing the storage Infrastructure [8hrs]

Monitoring *the* Storage Infrastructure -Parameters Monitored - Components Monitored - Monitoring Examples - Alerts, Storage Management Activities - Availability management - Capacity management - Performance management - Security Management - Reporting- Storage Management Examples, Storage Infrastructure Management Challenges.

Text Book:

1. Robert Spalding, Storage Networks: The Complete Reference, , Tata McGraw Hill.

Reference Book:

1. Information Storage and Management: Storing, Managing, and Protecting Digital Information, Wiley.

CA1214 **(4L hrs/week)**

OPERATING SYSTEM

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: The operating system is the most important program that runs on a computer. Every general-purpose computer must have an operating system to run other programs. Operating systems perform basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as disk drives and printers. This course covers the concept of operating system and its applications.

Pre-requisites: None

Unit-I

Introduction to Operating System [4hrs]

Introduction, Objectives and Functions of OS, Evolution of OS, OS Structures, OS Components, OS Services, System calls, System programs, Virtual Machines.

Processes & Threads [6hrs]

Process concept, Process scheduling, Co-operating processes, Operations on processes, Inter process communication, Communication in client-server systems. Introduction to Threads, Single and Multi-threaded processes and its benefits, User and Kernel threads, Multithreading models, Threading issues.

CPU Scheduling & Process Synchronization [10hrs]

Basic concepts, Scheduling criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real-time Scheduling, Algorithm Evaluation, Process Scheduling Models. Mutual Exclusion, Critical – section problem, Synchronization hardware, Semaphores, Classic problems of synchronization, Critical Regions, Monitors, OS Synchronization, Atomic Transactions

Deadlocks [6hrs]

System Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit-II

Memory Management & Disk Management [8hrs]

Logical and physical Address Space, Swapping, Contiguous Memory Allocation, Paging, Segmentation with Paging. Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Attachment, stable-storage Implementation.

Virtual Management [8hrs]

Demand paging, Process creation, Page Replacement Algorithms, Allocation of Frames, Thrashing, Operating System Examples, Page size and other considerations, Demand segmentation.

File-System Interface & Implementation [5hrs]

File concept, Access Methods, Directory structure, File- system Mounting, File sharing, Protection and consistency semantics. File-System structure, File-System Implementations, Directory Implementation, Allocation Methods, Free-space Management, Efficiency and Performance, Recovery.

Protection and Security [5hrs]

Goals of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Revocation of Access Rights, Capability- Based Systems, Language – Based Protection. Security Problem, User Authentication, One – Time Password, Program Threats, System Threats, Cryptography, Computer – Security Classifications..

Reference Books:

1. Milan Milonkovic, Operating System Concepts and design, Tata McGraw Hill.
2. Tanenbaum, Operation System Concepts, Pearson Education.
3. Silberschatz / Galvin / Gagne, Operating System, Wiley.
4. William Stallings, Operating System, Pearson Education.
5. H.M.Deitel, Operating systems, Pearson Education.
6. Abraham Silberschatz and peter Baer Galvin, Operating System Concepts, Pearson.
7. Gary Nutt, Operating Systems, Pearson.

CA1215 **(3L hrs/week)**

OOPS with C++

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: The main objective is to learn the basic concept and techniques which form the object oriented programming paradigm. Object-oriented programming is a new way of thinking about problem using models organizes around real world concept. The Fundamental construct is the object which combines both data-structure and behavior in a single entity which is in contrast to conventional programming in which data-structure and behavior are loosely connected.

Pre-requisites: Basic Programming Concepts

Unit-I

Introduction [2hrs]
Evolution of programming methodologies-Procedure oriented versus Object Oriented Programming-characteristics of OOP, Basics of OOP, Merits and Demerits of OOP.

Data Types, Loops, Arrays [6hrs]
Different data types, operators and expressions in C++, Keywords in C++. Input and Output: Comparison of stdio.h and iostream.h, cin and cout. Decision and loop: Conditional statement - if-else statement, nested if-else statement, switch, break, continue, and goto statements, Looping statements-for loop, while loop, Do-while loop. Arrays: fundamentals-Single dimensional, multi-dimensional arrays, fundamentals of strings, different methods to accept strings, different string manipulations, array of strings.

Objects, classes & Structures [6hrs]
Definition-defining the class, defining data members and member functions, Access specifier-private, public, protected, objects as function arguments, returning objects from the function, scope resolution operator, and member function defined outside the class, difference between class and structure, array as class member data, Array of objects. Basics of structures-declaring and defining structure-Accessing structure members, array of structures, Unions difference between structures and Unions, Enumerated data types-declaration and their usage.

Functions in C++ [6hrs]
Function definition, function declaration, Built-in functions, user defined functions, calling the function, passing parameter-actual and formal, different methods of calling the function call by value, call by reference using reference as parameter and pointer as parameter, overload function-different types of arguments-different number of arguments, inline function, default argument, storage classes-automatic, external, static, register. **Constructor and Destructor:** Constructors-constructor with argument, constructor without arguments, constructor with default arguments, Dynamic constructor, constructor overloading, copy constructor, destructors, Manipulating private data members.

Unit-II

Operator overloading & Inheritance [5hrs]

Defining operator overloading, overloading unary operator, overloading binary operator, manipulation of string using overloaded operator, rules for overloading operator.Data conversion: conversion between Basic types, conversion between objects & Basic types, conversion between objects of different classes. Inheritance: Base Class & derived class, defining derived classes, protected access specifier, public inheritance and private inheritance-member accessibility, constructors and destructors in derived classes, Level of inheritance-single inheritance, multiple inheritance, multi-level inheritance, hierarchical inheritance, hybrid inheritance.

Pointers, Virtual function & Friend function [5hrs]

Pointer: Pointer declaration and Access, Pointer to void, pointer and arrays, pointer constant and pointer variable, pointer and functions, pointer, call by pointer arrays, array of pointers to string, printer sort, memory management-new and delete, pointer to object-referencing members using pointers, self-containing class, this pointer, returning values using this pointer. Virtual function: Normal member functions accessed with pointers, virtual member function access, late binding, pure virtual function, abstract class, virtual base class. Friend functions and static function: Purpose, defining friend functions, friend classes, static function, accessing static function numbering positive objects.

IO operations & Exceptions [5hrs]

Templates and Exception Handling: Introduction to templates, class templates, function templates, Member function templates, Template arguments, Exception handling. Console IO Operator: C++ stream and C++ stream classes, unformatted I/O operators, formatted I/O operators-manipulators-user defined manipulators.

Files [5hrs]

Class for file stream operators, opening and closing a file, file nodes, writing an object to disk, reading an object from disk, binary versus character files, I/O with multiple object, stream class, file pointer-specifying the position, specifying the object, tellg() function, seekg() function. Command line arguments.

Reference Books:

1. E. Balaguruswamy, Object Oriented Programming with C++, Tata McGraw Hill.
2. Strousstrup, The C++ Programming Language, Pearson Edition.
3. Lafore Robert, Object Oriented Programming in Turbo C++, Galgotia Publications.
4. Lippman, C++ Primer, Pearson.
5. Herbert Schildt , C++ completer reference, Tata McGraw Hill.
6. Yeshwanth Kanetkar, Let us C++ , BPB publication.

CA1216 **(3L hrs/week)**

DATA STRUCTURES USING C

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: A data structure is a particular way of storing and organizing data in a computer so that it can be used efficiently. Different kinds of data structures are suited to different kinds of applications and some are highly specialized to specific tasks. This course covers the basic concepts of different data structures which are the basic building blocks of Programming and problem solving.

Pre-requisites: Basic Knowledge of Mathematics

Unit-I

Introduction to Data structures [5hrs]

Definition, Classification of data structures: primitive and non-primitive, Elementary data organization, Time and space complexity of an algorithm (Examples), String processing. Dynamic memory allocation and pointers: Definition of dynamic memory allocation, Accessing the address of a variable, Declaring and initializing pointers, Accessing a variable through its pointer, Meaning of static and dynamic memory allocation, Memory allocation functions: malloc(), calloc(), free() and realloc(). Recursion: Definition, Recursion in C (advantages), Writing Recursive programs – Binomial coefficient, Fibonacci, GCD.

Searching [5hrs]

Basic Search Techniques: Sequential search: Iterative and Recursive methods, Binary search: Iterative and Recursive methods, Comparison between sequential and binary search.

Sorting [5hrs]

General background and definition, Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort.

Stack [5hrs]

Definition, Array representation of stack, Operations on stack: Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix, Applications of stacks.

Unit-II

Queue [5hrs]

Definition, Array representation of queue, Types of queue: Simple queue, Circular queue, Double ended queue (deque), Priority queue, Operations on all types of Queues

Linked List [5hrs]

Definition, Components of linked list, Representation of linked list, Advantages and Disadvantages of linked list. Types of linked list: Singly linked list, doubly linked list, Circular linked list, Operations on singly linked list: creation, insertion, deletion, search and display.

Tree [5hrs]

Definition : Tree, Binary tree, Complete binary tree, Binary search tree, Heap Tree terminology: Root, Node, Degree of a node and tree, Terminal nodes, Non-terminal nodes, Siblings, Level, Edge, Path, depth, Parent node, ancestors of a node. Binary tree: Array representation of tree, Creation of binary tree.

Traversal of Binary Tree & Graphs [5hrs]

Preorder, Inorder and postorder. Graphs, Application of Graphs, Depth First search, Breadth First search.

Text Books:

1. Tanenbaum, Data Structures Using C. Pearson Education.

Reference Books:

1. Weiss, Data Structures and Algorithm Analysis in C, Pearson.
2. Lipschutz, Schaum's outline series Data structures, Tata McGraw-Hill
3. Robert Kruse, Data Structures and program designing using 'C', PHI.
4. E. Balaguruswamy, Programming in ANSI C. Tata McGraw Hill.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1266 **(1.5P hrs/week)**

OOPS WITH C++ LAB

List of Programs

Part A

1. Number of vowels and number of characters in a string.
2. Write a function called zeros maller () that is passed with two introduce arguments by reference and set the smaller of the number to zero. Write a man() program to access this function.
3. Demonstration of array of object.
4. Using this pointer to return a value (return by reference).
5. Pointer sort.
6. Demonstration of virtual function.
7. Demonstration of static function.
8. Accessing a particular record in a student's file.

Part B

9. Using different methods to write programs to implement function overloading with default arguments for the following problems :

a) To find whether a given number is prime.
b) To find the factorial of a number

10. Write a program to create a database for a bank account contains Name, Account no, Account type, Balance, Including the following a) Constructors b) destructors call) default constructors d) input and output function ; input and output for 10 people using different methods.

11. Create a class to hold information of a husband and another for the wife. Using friend functions give the total salary of the family.

12. Write a program to overload the following operators (any 3)
    a) Binary operator '+' to concatenate 2 strings
    b) Relational operator '<' to find whether one data is less than the other
    c) Unary operator '++' to find the next date of a given date.

13. Create a base class for a stack and implement push and pop operation. Include a derived class to check for stack criteria such as a) stack empty b)stack full c) stack overflow d) stack underflow.

14. Create a database using concepts of files for a student including the following fields: Student- name, Student's Reg No, Student's Attendance (overall % of attendance); and enter data for 10 students and output the same in proper format.

15. Using operator overloading concept implement arithmetic manipulation on two complex numbers.

CA1267 **(1.5P hrs/week)**

DATA STRUCTURES USING C – LAB

List of Programs

Part A

1. Use a recursive function to find GCD of two numbers.
2. Use a recursive function to find the Fibonacci series.
3. Use pointers to find the length of a string and to concatenate two strings.
4. Use pointers to copy a string and to extract a substring from a given a string.
5. Use a recursive function for the towers of Hanoi with three discs.
6. Insert an integer into a given position in an array.
7. Deleting an integer from an array.
8. Write a program to create a linked list and to display it.
9. Write a program to sort N numbers using insertion sort.
10. Write a program to sort N numbers using selection sort.

Part B

1. Inserting a node into a singly linked list.
2. Deleting a node from a singly linked list.
3. Pointer implementation of stacks.
4. Pointer implementation of queues.
5. Creating a binary search tree and traversing it using in order, preorder and post order.
6. Sort N numbers using merge sort

CA1311 **(3L hrs/week)**

INTRODUCTION TO PUBLIC SPEAKING

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Expressing our ideas and thoughts to others through speech is a very important and most often challenging for all of us. At the same time, it is a winning point for professionals that opens many doors to their success in both professional and personal lives. As we all work in teams, sometimes spread across the globe, technology brings us all together. The main objective of this course is to teach the students about oral communication and what are some of the best etiquettes that one has to follow and one will be marked upon, while communicating with others.

Pre-requisites: None

Unit-I

Oral Communication [7 hrs]
Principles of nonverbal communication - through clothes and body language.

Speeches [7 hrs]
Types of managerial speeches - speech of introduction, speech of thanks, occasional speech, theme speech.

Interviews [7 hrs]
Mastering the art of giving interviews in selection or placement interviews, discipline interviews, appraisal interviews, exit interviews, Building Persuasion & Negotiation abilities.

Unit-II

Body Language & Grooming [6 hrs]
Introduction to Body Language, Postures, Gestures, Eye contact, Personality styles, Grooming, Dress code

Art of Communicating in Groups [6 hrs]
Reading Comprehension, Group communication by way of meetings &group discussions,

Business presentation [6 hrs]
Features of good presentations - Planning, Structuring and Delivering presentations - Handling questions - Coping with nervousness.

Reference Books:

1. Matthukutty M Monippally, Business Communication Strategies, Tata McGraw-Hill.
2. Chaturvedi P.D. et al, Business Communication; Concepts, Cases, & Applications, Pearson Education.
3. Shirley Taylor, Communication for Business, Pearson Education.
4. Lesiicar and Flatley, BasicBusiness Communication, Tata McGraw-Hill.
5. Courtan L. Bovee et al., Business Communication Today, Pearson Education.

CA1312 **(4L hrs/week)**

INFORMATION SECURITY FUNDAMENTALS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: The course primarily covers the Types of Threats, Vulnerabilities, Risks and various terminologies in Information Security. It explains the formation of Security policy at various levels inside the Organization and provides the definition Procedures, Standard and Guidelines. The units emphasizes the need of Performing Asset Classification and Declassification, Retention and Disposal of Information Asset also, it identifies the various levels of Authorization for access Viz., Owner, Custodian and User. The course covers the different types of Access Controls and Physical security measures to safeguard the Assets and conclusively, it deals with the Digital Rights Management also covering the concepts of Common Authentication protocols and Real world Protocols.
Pre-requisites: None

Unit-I

Introduction to Information Security [13 hrs]
Definition of Information Security, Evolution of Information Security; Basics Principles of Information Security; Critical Concepts of Information Security; Components of the Information System; Balancing Information Security and Access; Implementing IT Security, The system Development Life cycle, Security professional in the organization.

The Need for IT Security [13 hrs]
Business Needs-Protecting the functionality, Enabling the safe operations, Protecting the data, safe guarding the technology assets; Threats-compromises to Intellectual property, deliberate software attacks, Espionage and trespass, sabotage and vandalism; Attacks-Malicious Codes, Back Doors, Denial of Service and Distributed Denial of Service, Spoofing, sniffing, Spam, Social Engineering.

Unit-II

Risk Management [13 hrs]
Definition of risk management, risk identification, and risk control, Identifying and Accessing Risk, Assessing risk based on probability of occurrence and likely impact, the fundamental aspects of documenting risk via the process of risk assessment, the various risk mitigation strategy options, the categories that can be used to classify controls.

Network Infrastructure Security and Connectivity [13 hrs]
Understanding Infrastructure Security- Device Based Security, Media-Based Security, Monitoring and Diagnosing; Monitoring Network- Firewall, Intrusion Detection System, Intrusion Prevention system; OS and Network Hardening, Application Hardening; Physical and Network Security- Policies, Standards and Guidelines.

Text Book:

1. Nina Godbole , Information Systems Security , Wiley.

Reference Book:

1. Micki Krause, Information Security Management Handbook, Wiley.

CA1313 **(4L hrs/week)**

SOFTWARE ENGINEERING

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Software engineering is concerned with developing and maintaining software systems that behave reliably and efficiently and satisfy all the requirements that customers have defined for them. The units emphasizes on requirements of software, its prototyping, designing and finally testing of software.

Pre-requisites: None

Unit-I

Software Product and Process [6hrs]
Introduction, S/W Engineering Paradigm –Verification and Validation, Life Cycle models, System Engineering, Computer based system, Business Process Engineering, Product Engineering – Overview.

Software Requirements [6hrs]
Functional and Non-functional, Software Document – Requirement Engineering Process, Feasibility Studies,

Software Prototyping [6hrs]
Prototyping in the Software Process, Data – Functional and Behavioral Models, Structured Analysis and Data Dictionary

Analysis, Design, Concepts and Principles [8hrs]
Systems Engineering - Analysis Concepts, Design Process and Concepts- Modular Design, Design Heuristic – Architectural Design, Data Design, User Interface Design, Real Time Software Design ,System Design – Real Time Executives , Data Acquisition System , Monitoring And Control System.

Unit- II

Testing [6hrs] Taxonomy of Software Testing, Types of S/W Test - Black Box Testing – Testing Boundary Conditions.

Structural Testing [6hrs]
Test Coverage Criteria Based On Data Flow Mechanisms, Regression Testing, Unit Testing, Integration Testing, Validation Testing ; System Testing And Debugging; Software Implementation Techniques.

Software Project Management [6hrs]
Measures And Measurements – ZIPF's Law, Software Cost Estimation, Function Point Models - COCOMO Mode, Delphi Method.

Scheduling [8hrs]
Earned Value Analysis, Error Tracking; Software Configuration Management ,Program Evolution Dynamics, Software Maintenance, Project Planning
Project Scheduling, Risk Management – CASE Tools

Recommended Readings:

1. Ian Sommerville, Software engineering, Pearson Education.
2. Roger S. Pressman, Software Engineering – A practitioner's Approach, Tata McGraw-Hill.

CA1314 **(3L hrs/week)**

RDBMS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: A database management system (DBMS) is collection of software meant to manage a Database. Many popular databases currently in use are based on the relational database model. RDBMSs have become a predominant choice for the storage of information in new databases used for financial records, manufacturing and logistical information, personnel data and much more. The course covers the basic concepts of databases in general with an emphasis on relational databases, modeling techniques and writing queries. Normalization techniques, Transaction processing, Concurrency Control techniques and Recovery of databases against crashes are also covered.

Pre-requisites: None

Unit-I

Introduction [4hrs]
Purpose of Database System -– Views of data – Data Models – Database Languages —– Database System Architecture – Database users and Administrator – Entity– Relationship model (E-R model) – E-R Diagrams -- Introduction to relational databases

Relational Model [4hrs]
The relational Model – The catalog- Types– Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - Fundamental operations – Additional Operations-

SQL fundamentals [6hrs]
Oracle data types, Data Constraints, Column level & table Level Constraints, working with Tables. Defining different constraints on the table, Defining Integrity Constraints in the ALTER TABLE Command, Select Command, Logical Operator, Range Searching, Pattern Matching,

Oracle Function [6hrs]
Grouping data from Tables in SQL, Manipulation Data in SQL. Joining Multiple Tables (Equi Joins), Joining a Table to itself (self Joins), Sub queries Union, intersect & Minus Clause, Creating view, Renaming the Column of a view, Granting Permissions, - Updating, Selection, Destroying view Creating Indexes, Creating and managing User Integrity – Triggers – Security.

Unit- II

Advanced SQL features [5hrs]
Embedded SQL– Dynamic SQL- Missing Information– Views – Introduction to Distributed Databases and Client/Server Databases.

Database Design [5hrs]
Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form-Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

Transactions [5hrs]
Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery – Media Recovery – Two Phase Commit - Save Points – SQL Facilities for recovery –

Concurrency [5hrs]
Need for Concurrency – Locking Protocols – Two Phase Locking – Intent Locking – Deadlock-Serializability – Recovery Isolation Levels – SQL Facilities for Concurrency.

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, Database System Concepts Tata McGraw Hill.
2. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, Pearson.
3. Raghu Ramakrishnan, Database Management Systems,Tata McGraw Hill.

CA1315 **(4L hrs/week)**

COMPUTER NETWORKS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: It is important for networking professionals to have a sound grounding in the basics of networking and with the networking technology being developed thick and fast, the professionals need to be updated of them at all times. The focus of this unit is providing a background to the basics of networking and its underlying principles. The learners taking this unit will explore the fundamentals of networking, the principle and purpose behind layered models, devices used in networks and their wireless connectivity and the ways to troubleshoot network related issues. This course enables learners to understand computer networking concepts, how they work, how they operate and the protocols, standards and the models associated with networking technology and their troubleshooting mechanisms.

Pre-requisites: None

Unit-1

Networking Fundamentals [6hrs]
Basics of Network & Networking, Advantages of Networking, Types of Networks, Network Terms- Host, Workstations, Server, Client, Node, Types of Network Architecture- Peer-to-Peer & Client/Server, Workgroup Vs. Domain. Network Topologies, Types of Topologies, Logical and physical topologies, selecting the Right Topology.

Networking Media and OSI model [8hrs]
Types of Transmission Media, Communication Modes, Wiring Standards and Cabling- straight through cable, crossover cable, rollover cable, media connectors (Fiber optic, Coaxial, and TP etc.) Introduction of OSI model, Seven layers of OSI model, Functions of the seven layers, Introduction of TCP/IP Model, TCP, UDP, IP, ICMP, ARP/RARP, Comparison between OSI model & TCP/IP model. Overview of Ethernet Addresses.

Basics of Network Devices [6hrs]
Network Devices- NIC- functions of NIC, installing NIC, Hub, Switch, Bridge, Router, Gateways, And Other Networking Devices, Repeater, CSU/DSU, and modem, Data Link Layer: Ethernet, Ethernet standards, Ethernet Components,Point-to-Point Protocol(PPP),PPP standards, Address Resolution Protocol, Message format, transactions.

Wireless Networking [6hrs]
Wireless Technology, Benefits of Wireless Technology, Types of Wireless Networks: Ad-hoc mode, Infrastructure mode, Wireless network Components: Wireless Access Points, Wireless NICs, wireless LAN standards: IEEE 802.11a, IEEE 802.11b, IEEE 802.11g, wireless LAN modulation techniques, wireless security Protocols: WEP, WPA, 802.1X, Installing a wireless LAN

Unit-II

Basics of Network, Application Layers [8hrs]

Network Layer: Internet Protocol (IP), IP standards, versions, functions, IPv4 addressing, IPv4 address Classes, IPv4 address types, Subnet Mask, Default Gateway, Public & Private IP Address, methods of assigning IP address, IPv6 address, types, assignment, Data encapsulation, The IPv4 Datagram Format, The IPv6 Datagram Format, Internet Control Message Protocol (ICMP), ICMPv4, ICMPv6, Internet Group Management Protocol (IGMP), Introduction to Routing and Switching concepts.

Transport Layer [**4hrs]**

Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Overview of Ports & Sockets, Application Layer: DHCP, DNS, HTTP/HTTPS, FTP, TFTP, SFTP, Telnet, Email: SMTP, POP3/IMAP, NTP.

WAN Technology [6hrs]

What Is a WAN?, WAN Switching, WAN Switching techniques Circuit Switching, Packet Switching etc., Connecting to the Internet : PSTN, ISDN, DSL, CATV, Satellite-Based Services, Last Mile Fiber, Cellular Technologies, Connecting LANs : Leased Lines, SONET/SDH, Packet Switching, Remote Access: Dial-up Remote Access, Virtual Private Networking, SSL VPN, Remote Terminal Emulation, Network security: Authentication and Authorization, Tunneling and Encryption Protocols, IPSec, SSL and TLS,Firewall, Other Security Appliances, Security Threats

Network Operating Systems and Troubleshooting Network [8hrs]

Network Operating Systems: Microsoft Operating Systems, Novell NetWare, UNIX and Linux Operating Systems, Macintosh Networking, Trouble Shooting Networks: Command-Line interface Tools, Network and Internet Troubleshooting, Basic Network Troubleshooting : Troubleshooting Model, identify the affected area, probable cause, implement a solution, test the result, recognize the potential effects of the solution, document the solution, Using Network Utilities: ping, traceroute, tracert, ipconfig, arp, nslookup, netstat, nbtstat, Hardware trouble shooting tools, system monitoring tools

Reference Books:

1. CCNA Cisco Certified Network Associate: Study Guide, Wiley.
2. Routing Protocols and Concepts CCNA Exploration Companion Guide, Pearson,

CA1316 **(3L hrs/week)**

PROGRAMMING IN JAVA

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Object oriented programming is the most proven technique for developing reliable programs. It helps in increased productivity, reusability of code, decrease in the development time, and reduces cost of production to an extent. The cost of maintaining such systems have also considerably decreased. There are many languages which used the object oriented concepts and techniques. Some of them are C++, Java, Smalltalk, Objective-C, etc. Java is a purely object oriented language. Systems/applications created using java programming language reduces the need for developing and maintain complex and space consuming applications. Java has a lot of advantages of being simple, robust, platform independent, etc. Nowadays java is also found in the mobile phones. This unit focuses on the concepts of object oriented programming language and the different constructs for creating applications in java. This course provides students with an understanding of the object oriented concepts which help in the field of programming, management of data, etc. and of Java programming which helps to explore the object oriented nature of the language and the multi-platform versatility offered by it.

Pre-requisites: Basic concepts of Object Oriented Programming

Unit-I

Introduction [5hrs]
History and Overview of Java, Object Oriented Programming, Control statements- if and for loop Using Blocks of codes, Lexical issues - White space, identifiers, Literals, comments, separators, Java Key words, Data types - Integers, Floating point, characters, Boolean, A closer look at Literals, Variables, Type conversion and casting. Automatic type promotion in Expressions Arrays.

Operators & Control Statements [5hrs]
Operators - Arithmetic operators, Bit wise operators, Relational Operators, Boolean Logical operators, Assignment Operator, Operator Precedence. Control Statements – Selection Statements - if, Switch, Iteration Statements - While, Do-while, for Nested loops, Jump statements.

Classes [5hrs]
Class Fundamentals, Declaring objects, Assigning object reference variables. Methods - constructors, “this” keyword, finalize ( ) method A stack class, Over loading methods. Using objects as parameters, Argument passing, Returning objects. Recursion, Access control, Introducing final, understanding static. Introducing Nested and Inner classes. Using command line arguments.

Inheritance [5hrs]
Basics, Using super, method overriding, Dynamic method Dispatch, Using abstract classes and final with Inheritance

Unit-II

Packages [5hrs]

Definition. Access protection importing packages. Interfaces: Definition and implementation. Exception Handling – Fundamentals, types, Using try and catch and Multiple catch clauses, Nested try Statements, throw, throws, finally. Java's built-in exception, using Exceptions.

Multithreaded Programming [5hrs]

Java thread model – main thread, creating single and multiple thread. isalive( ) and join( ). Thread – Priorities, Synchronization, Inter thread communication, suspending, resuming and stopping threads, using multi-threading. I / O basics – Reading control input, writing control output, Reading and Writing files.

Applet Fundamentals [5hrs]

AWT package, AWT Event handling concepts, The transient and volatile modifiers. Using instance of using assert.

JAVA Database Connectivity (JDBC) [5hrs]

Database connectivity – JDBC architecture and Drivers. JDBC API - loading a driver, connecting to a database, creating and executing JDBC statements, handling SQL exceptions. Accessing result sets: types and methods. An example - JDBC application to query a database.

Text Book:

1. E. Balagurusamy, Programming with Java, Tata McGraw Hill.
2. Herbert Schildt, Java: The Complete Reference, Tata McGraw Hill.

Reference Books:

3. K. Arnold and J. Gosling, The Java Programming Language, Addison Wesley.
4. Allamaraju, Professional Java Server Programming, Shroff Publication.
5. Patrick Naughton and Herbert Schildt, JAVA2: The Complete Reference, Tata McGraw Hill.
6. R. Krishnamoorthy & S. Prabhu, Internet & Java Program, New Age Internet Publisher

CA1366 **(1.5P hrs/week)**

RDBMS – Lab

List of programs

1. Create User in Oracle Database and grant and revoke the privileges and use of commit savepoint roleback command.
2. Create the following:
- Synonym sequences and Index
- Create alter and update views.
3. Create PL/SQL program using cursors, control structure, exception handling
4. Create following:
- Simple Triggers
- Package using procedures and functions.
5. Create the table for
- COMPANY database
- STUDENT database and Insert five records for each attribute.
6. Illustrate the use of SELECT statement
7. Conditional retrieval - WHERE clause
8. Query sorted - ORDER BY clause
9. Perform following:
- UNION, INTERSECTION and MINUS operations on tables.
- UPDATE, ALTER, DELETE, DROP operations on tables
10. Query multiple tables using JOIN operation.
11. Grouping the result of query - GROUP BY clause and HAVING clause
12. Query multiple tables using NATURAL and OUTER JOIN operation.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1367 **(1.5P hrs/week)**

PROGRAMMING IN JAVA – LAB

List of Programs
Part A

1. Write a program to check whether two strings are equal or not.
2. Write a program to display reverse string.
3. Write a program to find the sum of digits of a given number.
4. Write a program to display a multiplication table.
5. Write a program to display all prime numbers between 1 to 1t000.
6. Write a program to insert element in existing array.
7. Write a program to sort existing array.
8. Write a program to create object for Tree Set and Stack and use all methods.
9. Write a program to check all math class functions.
10. Write a program to execute any Windows 95 application (Like notepad, calculator etc)
11. Write a program to find out total memory, free memory and free memory after executing garbage Collector (gc).

Part B

12. Write a program to copy a file to another file using Java to package classes. Get the file names at run time and if the target file is existed then ask confirmation to overwrite and take necessary actions.
13. Write a program to get file name at runtime and display number of lines and words in that file.
14. Write a program to list files in the current working directory depending upon a given pattern.
15. Create a textfileld that allows only numeric value and in specified length.
16. Create a Frame with 2 labels, at runtime display x and y command-ordinate of mouse pointer in the labels.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1411 **(3L hrs/week)**

EMPLOYABILITY SKILLS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: To be qualified for employment and to work in a corporate sector demands not only the technical knowledge and experience but interpersonal skills like speaking skills, professional etiquettes and so on. In this course, students will be taught how to develop these skills and apply them in our everyday interactions with people, both in our personal and professional lives.
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Pre-requisites: Little knowledge of English

Unit-I

Speaking skills
Group Discussions; Importance of Group Discussions; Difference between Group Discussion, Panel Discussion and Debate; Format of GD as used in national level recruitment boards, Rules, ambience and normal practices, Dos and Don'ts in Group Discussions, Traits Evaluated in GDs

Etiquette and Mannerism
Introduction; Professional etiquette – Etiquette at meetings, Dining, Involuntary Awkward Actions; Technology Etiquette – Phone, Email, Social Media, Video Conferencing, Web interview

Professional Presentations
Nature of Oral Presentation; Planning a Presentation, Preparing the Presentation; Delivering the Presentation

Unit-II

Recap on Employability Skills I
Group Discussions; Etiquette & Mannerisms; Professional Presentations & Personal Grooming

Resume & Job Application
Introduction; What is a Resume; What is a Curriculum Vitae; What is a scannable resume; How to develop an impressive resume; Different formats of Resume; Job application or cover letter

Job Interviews
Definition of interview; Background information; Types of interviews; Preparatory steps for Job interviews; Interview Skill tips; Changes in the interview process, Frequently asked questions during interviews

Reference books:

1. Edgar Thorpe and Showick Thorpe, Objective English, Pearson Publishers.
2. Caroline Hatcher, The essential guide for students, Sage publications.
3. Gajendra Singh, Soft Skills – An integrated approach to Maximize Personality, Wiley.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1412 **(3L hrs/week)**

INSTALLATION AND CONFIGURATION OF SERVER

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Servers play a very important role in Microsoft technology, especially in domain environment. It is imperative for a student to be aware of the installation and configuration of the server as per the plan and strategy of the enterprise.

Pre-requisites: None

Unit-1

Selecting & Installing Servers [5hrs]
Selecting a Windows Server 2012:- Edition, Supporting Server Role, Supporting Server Virtualization, Server Licensing. Installing Windows Server 2012: System Requirement, Performing a Clean Installation, Installing Third-Party Drivers, Working with Installation Partitions, Using Server Core, Server Core Defaults, Server Core Capabilities, Using the Minimal Server Interface, Upgrade paths, Preparing to Upgrade Installation, Installing Windows Server Migration Tools.

Configuring Servers [5hrs]
Completing Post-Installation Tasks and GUI Tools, Converting Between GUI and Server, Configuring NIC Teaming, Using Roles, Features, and Services, Using Roles Manager, Adding Roles and Features, Deploying Roles to VHDs, Configuring Services

Configuring Local Storage [5hrs]
Planning Server Storage, Determining the Number of Servers Needed, Estimating Storage Requirements, Selecting a Storage Technology, Selecting a Physical Disk Technology, Using External Drive Arrays, Planning for Storage Fault Tolerance, Using Disk Mirroring, Using RAID, Using Storages Spaces, Understanding Windows Disk setting, selecting a Partition style, understanding disk and Volume Types, Choosing a Volume Size, Understanding File System, Working with Disks, Adding a New Physical Disk, Creating and Mounting VHDs, Storage Pool, Virtual Disks, Simple Volume, Creating a Striped, Spanned, Mirrored, or RAID-5 Volume, Extending and Shrinking Volumes and Disks

Configuring File and Share Access [5hrs]
Designing a File-Sharing Strategy, Arranging Shares, Controlling Access, Mapping Drives, Creating Folder Shares, Assigning Permissions, Understanding the windows Permission Architecture and Basic, Advanced Permissions, Allowing and Denying Permissions, Inheriting Permissions, Understanding Effective Access, Setting Share Permissions, Understanding NTFS Authorization, Assigning Basic NTFS Permissions, Understanding Resource Ownership, Combining Share and NTFS Permissions

Unit- II

Configuring Print & Document Services [5hrs]
Understanding the Windows Print Architecture and Printing, Server Printing Flexibility, sharing a Printer Drivers and Managing Printer Drivers, Using Remote Access Easy Print, Configuring Printer Security, Adding Printer Servers, Deploying Printers with Group Policy, Adding Server and Workgroup Servers, Calibrating Server Manager Performance.

Configuring Servers for Remote Management [5hrs]
Configuring WinRM and Windows Firewall, Creating Server Groups, Using Remote Server Administration Tools, Using Windows PowerShell Web Access, Installing Windows PowerShell Web Access, Configuring the Windows PowerShell Web Access Gateway, Configuring a Test Installation, Customizing a Gateway Installation, Creating Authorization Rules, Working with Remote Servers.

Creating and Configuring Virtual Machine Settings and Storage [5hrs]
Virtualization Architectures, Hyper-V Implementations and Licensing, Hyper-V Hardware Limitations and Server, Installing Hyper-V, Using Hyper-V Manager, Creating a VM, Installing an Operating System, Configuring Guest Integration Services, Allocating Memory, Using Dynamic Memory, working with Virtual Disks, Understanding Virtual Disk Formats,

Creating Virtual Disks [5hrs]
Creating a New Virtual Disk, Adding Virtual Disks to Virtual Machines, Creating Differencing Disks, Configuring Pass-Through Disks, Modifying Virtual Disks, Creating Snapshots, Connecting to a SAN, Connecting Virtual Machines to a SAN

Text Books:

1. Craig Zacker, Installing and Configuring Widows Server 2012, Microsoft.
2. Mark Minasi, Kevin Greene, Christian Booth, Robert Butler, Mastering Windows Server 2012, Microsoft,

Re**ference Books:**

1. David Camardella, Don Poulton, MCSA 70-410 Cert Guide R2: Installing and Configuring Windows Server 2012.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1413 **(3L hrs/week)**

ETHICAL HACKING FUNDAMENTALS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: The course primarily covers the Ethical hacking methodology and its different stages which include the Foot printing, Scanning, Enumeration and System hacking techniques and a broad knowledge about white box and black box testing. The Unit describes a wide range of attacks that can cause adverse negative effects on IT systems that include Denial of service, Session hijacking and severe vulnerabilities that can be seen in Web Applications. The Unit also covers hacking attacks caused in other Operating System environment like Linux and the secret techniques to Evade Firewalls. The Unit not only captures valuable information on vulnerabilities and threats but also covers an effective way of report making methodology that can helps the top level management to take immediate decisions on mitigating the threats. The course enables students to better understand the Ethical hacking concepts and various phases of hacking along with the objective of providing an in-depth knowledge on Web Application vulnerabilities and exploitation techniques. To familiarize them with the wide range of attacks in a Networking environment and to enable him/her to prepare a well- defined vulnerability reporting procedure along with the remediation techniques.

Pre-requisites: Computer Knowledge

Unit-I

Introduction to Ethical Hacking [5hrs]
Hacking Methodology, Process of malicious hacking. Footprinting and Scanning: Footprinting, Scanning. Enumeration: Enumeration.

System hacking and Trojans [5hrs]

System hacking, Trojans and Black Box Vs White Box Techniques.

Attacking Methodology I [5hrs]
Denial of Service, Sniffers. Session hijacking and hacking Web Servers: Session hijacking, hacking Web Servers.

Attacking Methodology II [5hrs]
Web Application Vulnerabilities and Web Techniques Based Password Cracking: Web Application Vulnerabilities, Web Based Password Cracking Techniques.

Unit-II

Web and Network Hacking [7hrs]
SQL Injection, hacking Wireless Networking. Viruses, Worms and Physical Security: Viruses and Worms, Physical Security.

Linux hacking [6hrs]
Linux hacking. Evading IDS and Firewalls

Report writing and Mitigation [7hrs]

Introduction to Report Writing & Mitigation, requirements for low level reporting & high level reporting of Penetration testing results, Demonstration of vulnerabilities and Mitigation of issues identified including tracking

Text Book:

1. Ronald L. Krutz (Author), Russell Dean Vines, The CEH Prep Guide: The Comprehensive Guide to Certified Ethical Hacking, Wiley Publications.

CA1414 **(4L hrs/week)**

CRYPTOGRAPHY FUNDAMENTALS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Security is ubiquitous. With the advent of e-commerce and electronic transactions, the need for development of secured systems has grown tremendously. Cryptography is the study of building ciphers to ensure the confidentiality and integrity of information. Along with it is the activity of analyzing the strength of a cipher by subjecting it to several forms attack. This course covers the basic concepts of Cryptography, certain cryptographic algorithms and its applications.
Pre-requisites: computer knowledge

Unit-I

Introduction to Cryptography [13 hrs]
The Confidentiality, Integrity & Availability (CIA) Triad, Cryptographic concepts, methodologies &practices, Symmetric& Asymmetric cryptography, public& private keys, Cryptographic algorithms and uses, Construction& use of Digital signatures

Types of Algorithms [13 hrs]
The basic functionality of hash/crypto algorithms (DES, RSA, SHA, MD5, HMAC, DSA) and effects on key length concepts in Elliptical Curve Cryptography & Quantum Cryptography

Unit- II

Key Management [13 hrs]
The basic functions involved in key management including creation, distribution, verification, revocation and destruction, storage, recovery and life span and how these functions affect cryptographic integrity

Application of Cryptography[13 hrs]
Major key distribution methods and algorithms including Kerberos, ISAKMP etc., Vulnerabilities to cryptographic functions, the Use and functions of Certifying Authorities (CAs), Public Key Infrastructure (PKI) and System architecture requirements for implementing cryptographic functions

Reference Books:

1. Nina Godbole, Information Systems Security: Security Management, Metrics, Frameworks and Best Practices, Wiley.
2. N Harini and Dr T R Padmanabhan, Cryptography and Security, Wiley.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1415 **(4L hrs/week)**

INTRODUCTION TO CLOUD TECHNOLOGY

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Cloud computing is a colloquial expression used to describe a variety of different computing concepts that involve a large number of computers involves a large number of computers that are connected through a real-time communication network. In science, cloud computing is a synonym for distributed computing over a network and means the ability to run a program on many connected computers at the same time. This course covers basic concepts of cloud types, services and security etc.

Pre-requisites: Knowledge of operating system and network

Unit-I

Introduction [8hrs]

Introduction to Cloud Computing, History and Evolution of Cloud Computing, Types of clouds, Private Public and hybrid clouds, Cloud Computing architecture, Cloud computing infrastructure, Merits of Cloud computing, , Cloud computing delivery models and services (IaaS, PaaS, SaaS), obstacles for cloud technology, Cloud vulnerabilities, Cloud challenges, Practical applications of cloud computing.

Cloud Computing Companies [6hrs]

Web-based business services, Delivering Business Processes from the Cloud: Business process examples.

Migrating to Cloud [6hrs]

Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud, Efficient Steps for migrating to cloud., Risks: Measuring and assessment of risks, Company concerns Risk Mitigation methodology for Cloud computing, Case Studies

Cloud Cost Management [6hrs]

Assessing the Cloud: software Evaluation, System Testing, Seasonal or peak loading, Cost cutting and cost-benefit analysis, selecting the right scalable application. Considerations for selecting cloud solution.

Unit- II

Selection of Cloud Provider [6hrs]

Understanding Best Practices used in selection of Cloud service and providers, Clouding the Standards and Best Practices Issue: Interoperability, Portability, Integration, Security, Standards Organizations and Groups associated with Cloud Computing, Commercial and Business Consideration

Governance in the Cloud [6hrs]

Industry Standards Organizations and Groups associated with Cloud Computing, Need for IT governance in cloud computing, Cloud Governance Solution: Access Controls, Financial Controls, Key Management and Encryption, Logging and Auditing, API integration.

Legal Issues [6hrs]
Data Privacy and Security Issues, Cloud Contracting models, Jurisdictional Issues Raised by Virtualization and Data Location, Legal issues in Commercial and Business Considerations

ten cloud do an do nots [8hrs]
Don't be reactive, do consider the cloud a financial issue, don't go alone, do think about your architecture, don't neglect governance, don't forget about business purpose, do make security the centerpiece of your strategy, don't apply the cloud to everything, don't forget about Service Management, do start with a pilot project.

Text Book:

1. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Cloud Computing: Principles and Paradigms, Wiley.

Reference Books:

1. Christopher Barnett , Brief Guide to Cloud Computing.Robinson.
2. Borivoje Furht , Handbook on Cloud Computing, Springer.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1416 **(4L hrs/week)**

FUNDAMENTALS OF DATA CENTER

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: This course covers the significance, setting-up and Services provided by data centers. Datacenter fundamentals helps students to understand the basic concepts of Datacenter architecture, network infrastructure in a Datacenter, server frames fault tolerance, Datacenter availability, network implementation and disaster recovery.

Pre-requisites: Knowledge of Computer and networks

Unit-I

Overview of Data Centers [5hrs]
Data Centers defined, Data Center Goals, Data Center Facilities, Roles of Data Centers in the Enterprise, Roles of Data Centers in the Service Provider Environment

Application Architecture Models [5hrs]
The Client/Server Model and Its Evolution, The n-Tier Model, Multitier Architecture Application Environment, Data Center Architecture.

Data Center Requirements [8hrs]
Data Center Prerequisites, Required Physical Area for Equipment and Unoccupied Space, Required Power to Run All the Devices, Required Cooling and HVAC, Required Weight, Required Network Bandwidth, Budget Constraints, Selecting a Geographic Location, Safe from Natural Hazards, Safe from Man-Made Disasters, Availability of Local Technical Talent, Abundant and Inexpensive Utilities Such as Power and Water, Selecting an Existing Building (Retrofitting), tier standard

Data Center Design [8hrs]
Characteristics of an Outstanding Design, Guidelines for Planning a Data Center, Data Center Structures, No-Raised or Raised Floor, Aisles, Ramp, Compulsory Local Building Codes, Raised Floor Design and Deployment, Plenum, Floor Tiles, Equipment Weight and Tile Strength, Electrical Wireways, Cable Trays, Design and Plan against Vandalism,

Unit-II

Introduction to Server Farms [5hrs]
Types of server farms and data centre, internet server farm, intranet server farm, extranet server farm

Types of data centers [6hrs]
Internet data center, corporate data center, software defined data center, data center topologies, Aggregation Layer, Access Layer, Front-End Segment, Application Segment, Back-End Segment, Storage Layer, Data Center Transport Layer, Data Center Services, IP Infrastructure Services, Application Services, Security Services, Storage Services.

Business Continuity [7hrs]

Business continuance infrastructure services, the need for redundancy, Information availability, BC terminology, BC planning life cycle, BC technology solutions,

Disaster Recovery fundamentals [8hrs]

Backup and recovery considerations, backup technologies, Uses of local replicas, Local replication technologies, Restore and restart considerations, Modes of remote replications, remote replication technologies.

Text Books:

1. Gary Oreinstein, IP Storage Networking , Addison Wesley.
2. G. Somasundaram, Alok Srivastava, Information Storage and Management, Wiley.

Reference Books:

1. Kailash Jayswal, Administering Data-Centers, Wiley.

CA1466 **(1.5P hrs/week)**

ETHICAL HACKING FUNDAMENTALS - LAB

List of Programs

1. Passive Reconnaissance using “Who is” and Online tools
2. Active Reconnaissance using “Sampad” and web site details
3. Full Scan, half Open Scan and Stealth scan using “nmap”
4. UDP and Ping Scanning using “Advance Lan Scanner” and “Superscan”
5. Packet crafting using “Packet creator” tools
6. Exploiting NetBIOS vulnerability
7. Password Revelation from browsers and social networking application
8. Creating and Analyzing spoofed emails
9. Creating and Analyzing Trojans
10. OS password cracking

DEPARTMENT OF COMPUTER APPLICATIONS

CA1467 **(1.5P hrs/week)**

INSTALLATION AND CONFIGURATION OF SERVER – LAB

List of Programs

1. Installation of Windows Server 2012
2. Configuration of Windows Server
3. Configuration of Local Storage for Windows Server
4. Configuration of File and Share Access for Windows Server
5. Configuration of Print and Document Services for Windows Server
6. Configuration of Windows Server for Remote Management
7. Creating Virtual Machine in Windows Server
8. Configuring and Setting Virtual Machine

CA1511 **(3L hrs/week)**

COMPUTER FORENSICS AND INVESTIGATION

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Computer Forensics deals with the development of tools and software to gather evidences from computers, without corrupting the information contained. A relatively new field, it is quickly gaining momentum as the complexities in the crimes are on the rise and it has become imperative to treat each cybercrime with diligence. Students are taught about different forms of cybercrime and its implications and duties of professionals employed at different levels towards analyzing and controlling cybercrime. Methods to recover data from storage devices are covered in following chapters. Different forensic techniques and cyber laws are also dealt in detail.

Pre-requisites: Knowledge of computer and networks

Unit- I

Computer Forensics [8hrs]
Introduction to Computer Forensics, Forms of Cyber Crime, First Responder Procedure- Non-technical staff, Technical Staff, Forensics Expert and Computer Investigation procedure.

Storage Devices [8 hrs]
Storage Devices- Magnetic Medium, Non-magnetic medium and Optical Medium. Working of Storage devices-Platter, head assembly, spindle motor.

Data Recovery Methods [8 hrs]
Data Acquisition, Data deletion and data recovery method and techniques.

Unit- II

Forensics Techniques [8 hrs]
Windows forensic, Linux Forensics, Mobile Forensics, Steganography, Application Password cracking-Brute force, Dictionary attack, Rainbow attack. Email Tacking – header option of SMTP, POP3, IMAP.

Cyber Law [7 hrs]
Corporate espionage, Evidence handling procedure, Chain of custody, Main features of Indian IT Act 2008 (Amendment).

Text Book:
1. Nelson, Guide to Computer Forensics and Investigations, Cengange publication.

DEPARTMENT OF COMPUTER APPLICATIONS

CA15** **(4L hrs/week)**

ELECTIVE –I

[TO BE CHOSEN FROM LIST OF ELECTIVES FOR V SEMESTER]

CA1512 **(4L hrs/week)**

IT GOVERNANCE, RISK AND INFORMATION SECURITY MANAGEMENT

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: The unit primarily covers the importance of IT and IS Governances and the best practices followed by the Role of Steering committee and Chief Information Security Officer. The Unit also deals with the Risk management and the Information Security Management Practices including Hiring, Training, Promotion, Performance Evaluation, Required Vacations and Termination Policies, Sourcing Practices and Strategy for Information Security. The Unit also covers the Committee of Sponsoring Organizations and its importance and applicability, Sarbannes Oxley Act and its implications to the Industry.

Pre-requisites: None

Unit- I

IT Governance [13 hrs]
Introduction & Concepts, Role of Governance in Information Security, Best Practices for IT Governance. Role of IT Strategy Committee, Standard IT Balanced Scorecard. Val-IT framework of ISACA

Information Systems Strategy [13 hrs]
Role of Strategic Planning for IT, Role of Steering committee, Policies and Procedures

Unit-II

Risk Management Program [13 hrs]
Develop a Risk Management Program. Risk Management Process, Risk Analysis methods. Risk-IT Framework of ISACA

Information Security Management [13 hrs]
Introduction, Performance Optimization, IT Security roles & responsibilities, Segregation of Duties, Description of COBIT and other Frameworks

References Books:

1. Nina Godbole, Information Systems Security: Security Management, Metrics, Frameworks and Best Practices, Wiley.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1513 **(4L hrs/week)**

LINUX ADMINISTRATION

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: RHEL is a high performing operating system that. RHEL 6 is the sixth generation of the long term and predictable operating platform. With the flexibility to deploy on physical hardware, as a virtual host, as a virtual guest or in the cloud, Red hat Enterprise Linux 6 is the ideal foundation for next-generation datacenters. The fresh system administrators need to have a strong functional knowledge of RHEL 6 in any current IT work environment. The unit explores the security and network access controls in Linux, organizing network system and Mail Services, Securing Data and Account Management.

Pre-requisites: Computer knowledge

Unit-I

Fundamentals of Linux [6hrs]
Development of Linux, Linux Distributions. Structure of Linux Operating System, Logging In and General Orientation, The X Window System, KDE, GNOME. Navigating the File Systems, Managing Files, File Permission and Access, Shell Basics, Shell Advanced Features, File Name Generation. Common Unix commands

Administration of Linux OS [8hrs]
Installing Linux, Configuring Disk Devices, Creating and Managing File Systems, File System Backup, Kickstart Installation, Linux Boot Loaders, Linux Kernel Management, Managing User Accounts, Understanding File Listing, Ownership and Permission, Managing Software using RPM, Connecting to Network, Linux Network Services, Setting up a Printer

Input and Output Redirection [6hrs]
Input Redirection, Output Redirection, Error Redirection, Filter, Pipes. Networking in Linux: Network Connectivity, IP address, Accessing Remote system, Transferring files, and Internet configuration.

Process Control [6hrs]
Identifying Process, Managing Process, Background Processing, Putting jobs in Background. Offline File Storage: Storing files to Media Booting process and User

Unit-II

Linux Basic networking and naming service [6hrs]
Introduction to Networking, Networking, Internet Network Services, Dynamic DNS, Electronic Messaging, Apache, NIS and Network File Sharing: NIS, Network File Sharing, SAMBA.

Security [6hrs]
Defining System Security Policies, System Authentication Services and Security, Securing Services, Securing Data and Communication

The Unix File System [6hrs]
Inodes - Structure of a regular file – Directories - Conversion of a path name to an inode -Super block - Inode assignment to a new file - Allocation of disk blocks.

System calls for the file System [8hrs]
Open – Read - Write - Lseek – Close - File creation - Creation of special files -Changing directory and root - changing owner and mode – stat and fstat - pipes - Dup -Mounting and Un mounting file systems - Link and Un link.

Text Books:

1. Bach, M.J., The Design of the Unix Operating System, PHI.
2. Karee Christian, The Unix Operating System, John Wiley & Sons.

Reference Books:

1. Vahalia, Unix Internals: The New Frontiers, Pearson Education.
2. UreshVahalia, UNIX Internals: The New Frontiers, PHI.
3. M. Beck et al, Linux Kernel Programming, Pearson Education.
4. Sumitabha Das, UNIX Concepts and Applications, Tata McGraw Hill.

CA1514 **(4L hrs/week)**

INTRODUCTION TO CLOUD COMPUTING SOLUTIONS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Windows Azure is a cloud computing platform and infrastructure, for building, deploying and managing applications and services through a global network of Microsoft-managed data centers
Pre-requisites: Knowledge of computing

Unit-I

Introduction [14 hrs]
Introduction to MS. Azure, **Virtual Machines:** Creating Virtual Machines, Difference Between Basic and Standard VMs, Logging in to a VM and Working, Attaching an empty hard Disk to VM, hosting a Website in VM, Configuring End Points, Scaling up and Down, Creating a custom Image from VM, Creating a VM from a custom Image, Shut down VM without Getting Billed, VM Pricing

Managing Infrastructure in Azure [13 hrs]
Managing Infrastructure in Azure: Azure Virtual Networks, highly Available Azure Virtual Machines, Virtual Machine Configuration Management, Customizing Azure Virtual Machine Networking. Load Balancing: Creating Cloud Services, Adding Virtual Machines to a Cluster, Configuring Load Balancer.

Windows Azure [10 hrs]
Azure Storage: What is a Storage Account, Advantages, Tables, blobs, queues and drives, Azure Appfabric: Connectivity and Access control Automation: Introduction Windows Power Shell, Creation of Runbooks, Uploading a Shell Script, Authoring a Shell Script,

Unit-II

SQL Azure [8 hrs]
SQL Azure: Creating a SQL Server, Creating a SQL DB, Creating Tables, Adding Data to the Tables, View Connection Strings, Security Configurations, Migrating on premise DB to SQL Azure.

Websites [7 hrs]
Websites: Creating a Website, Setting deployment credentials, Choosing a platform, Setting up Defaultpage for website, Scaling ,Auto Scaling by Time, Auto Scaling by Metric, Difference between Free, Shared, Basic and Standard websites, Creating a website using Visual studio.

Text Book:
1. Barrie Sosinsky , Cloud Computing Bible, Wiley.

Reference Books:
1. James Broberg, Cloud Computing: Principles and Paradigms, Wiley.

CA1515 **(3L hrs/week)**

PRINCIPLES OF VIRTUALIZATION

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Virtualization is the single most effective way to reduce IT expenses while boosting efficiency and agility in organizations. This unit explores the implementation and usage of VMWare Virtualization, its installation process and the working of Windows Server hyper V.

Pre-requisites: Knowledge of computer hardware

Unit- I

Basics of Virtualization [9 hrs]
Understanding Virtualization, Need of Virtualization and Virtualization Technologies: Server Virtualization, Storage Virtualization, I/O Virtualization, Network Virtualization, Client Virtualization, Application virtualization, Desktop virtualization, Understanding Virtualization Uses: Studying Server Consolidation, Development and Test Environments , Helping with Disaster Recovery

Deploying and Managing an Enterprise Desktop Virtualization Environment [9 hrs]
Configure the BIOS to support hardware virtualization; Install and configure Windows Virtual PC: installing Windows Virtual PC on various platforms (32-bit, 64-bit), creating and managing virtual hard disks, configuring virtual machine resources including network resources, preparing host machines; create, deploy, and maintain images

Deploying and Managing a Presentation Virtualization Environment [8 hrs]
Prepare and manage remote applications: configuring application sharing, package applications for deployment by using RemoteApp, installing and configuring the RD Session Host Role Service on the server.

Unit-II

Accessing published applications [9 hrs]
Access published applications: configuring Remote Desktop Web Access, configuring role-based application provisioning, configuring Remote Desktop client connections. Configure client settings to access virtualized desktops: configuring client settings

Understanding Virtualization Software [9 hrs]
List of virtualization Software available. Vmware- introduction to Vsphere, ESXi, VCenter Server and Vsphere client.

Creating Virtual Machine [8 hrs]
Introduction to HYPER-V role. Create Virtual Machines. Create Hyper-v virtual networking, Use virtual Machine Snapshots. Monitor the performance of a Hyper-v server, Citrix XEN Desktop fundamentals

Reference Books:

1. Twan Grotenhuis, Virtualization with Microsoft Virtual Server 2005, Syngress Publications.

CA1566 **(1.5P hrs/week)**

COMPUTER FORENSICS AND INVESTIGATION – LAB

List of Programs:

1. Physical Collection of electronic evidence using forensic standards
2. Dismantling and re-building PCs in order to access the storage media safely
3. Boot sequence and Power On Self-Test mode analysis
4. Examination of File systems of Windows, Linux and Mac
5. Analyzing Word processing and Graphic file format
6. Network data sniffing and analyzing
7. Password and encryption techniques
8. Internet forensic and Malware analysis
9. Data recovery techniques for hard drive
10. Data recovery techniques for Pen drive and CD

CA1567 **(1.5P hrs/week)**

PRINCIPLES OF VIRTUALIZATION-LAB

List of Programs

1. Installing Vmware ESXi server.
2. Installing Vmware vCenter with all the prerequisites.
3. Creating Virtual Machines using vCenter server.
4. Modifying Virtual Machine settings.
5. Clone a VM.
6. Installing Vmware ESXi server.
7. Installing Vmware vCenter with all the prerequisites.
8. Creating Virtual Machines using vCenter server.
9. Modifying Virtual Machine settings.
10. Clone a VM.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1551 **(4L hrs/week)**

VIRTUALIZATION AND CLOUD SECURITY

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Server virtualization is today's most rapidly-evolving and widely-deployed technologies. Highly beneficial to organizations in terms of cost and ease of deployment and management of virtualized servers, deploying desktop, application and network virtualization is in demand. Beginning from basics of virtualization and Cloud Security, students proceed to more detailed topics in Cloud like Cloud Trust Protocol & Transparency and Cloud Controls Matrix.

Pre-requisites: Knowledge of virtualization and information Security

Unit-I

Introduction to Cloud [9 hrs]
Cloud computing concepts - Private cloud Vs Public cloud, IAAS, PAAS & SAAS concepts,

Introduction to Virtualization [9 hrs]
Virtualization security concerns – hypervisor and host/Platform Security, Security communications between - Guest instances, hosts and Guests

Cloud Security [9 hrs]
Cloud Security vulnerabilities and mitigating controls, Cloud Trust Protocol, Cloud Controls Matrix, Complete Certificate of Cloud Security Knowledge (CCSK)

Unit-II

Cloud Trust Protocol & Transparency [9 hrs]
Introduction to Cloud Trust Protocol & Transparency, Cloud Trust Protocol and Transparency, Transparency as a Service, Concepts, Security, Privacy & Compliance aspects of cloud

Cloud Controls Matrix [10 hrs]
Introduction to Cloud Controls Matrix, Cloud Controls Matrix, Trusted Cloud Initiative architecture and reference model, Requirements of Security as a Service (Secaas) model

Top Cloud threats [6 hrs]
Top Security threats to the cloud model.

Recommended Readings:
Cloud Security – A comprehensive Guide to Secure Cloud Computing by Ronald L. Krutz and Russel Dean Vines

Text Books:

1. Michael Miller, Cloud computing: Web based applications that change the way you work and collaborate online, Pearson.
2. Haley Beard, Cloud computing best practices for managing and measuring processes for on demand computing, Applications and data centres in the cloud with SLAs, Emereo.

Reference Books:

1. Guy Bunker and Darren Thomson, Delivering Utility Computing, John Wiley & Sons.
2. George Reese, Cloud Application Architectures, O'Reilly.
3. Lee Gillam, Cloud Computing: Principles, Systems and Applications, Springer.
4. Brian J. S. Chee, Curtis Franklin, Jr., Cloud Computing: Technologies and Strategies of the Ubiquitous Data Center, CRC Press.

CA1552 **(4L hrs/week)**

PROFESSIONAL SKILLS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: This course focuses on developing skill sets that help students become stronger, more confident leaders and help to understand some of the processes involved in decision making, to the psychology of decision making and the social context in which decisions are made. Topics include Leadership & Team building, Decision Making &Negotiation, Creativity at workplace, emotional intelligence. Upon completion of this course, the students will be able to describe and discuss leadership characteristics and styles, evaluate the effectiveness of specific leadership styles in a given situation, describe how leadership impacts motivation and the workplace, have greater insight into decision-making processes, use that insight to make more effective decisions, importance of teamwork, develop emotional intelligence that will help to recognize and manage one's emotions as well as others**.**

Pre-requisites: Knowledge of English

Unit-I

Leadership [9 hrs]
Leader and Leadership; Leadership Traits; Leadership Styles; Leadership Trends

Team Building [9 hrs]
Team Building; Types of Teams

Decision Making [9 hrs]
What is Decision Making; Steps for Decision Making; Decision Making Techniques;

Unit-II

Negotiation [9 hrs]
Negotiation Fundamentals; Negotiation Styles; Major Negotiation Concepts

Creativity at Work Place [8 hrs]
Creativity; Motivation; Nurturing Hobbies at work; The Six Thinking Hat Method

Emotional Intelligence [8 hrs]
Meaning and Definition; Need for Emotional Intelligence; Intelligence Quotient versus Emotional Intelligence quotient; Components of EI, Skills to develop EI

Text books:

1. Gajendra Singh Chauhan & Sangeeta Sharma, Soft Skills – An integrated approach to Maximize Personality, Wiley.
2. Material prepared by the Department.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1553 **(4L hrs/week)**

BUSINESS ORGANISATION BASICS

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: This course introduces students to the world of business and the practice of management. It is designed to provide the student a basic understanding of organizations, managers, business, and themselves. Students will learn to see and analyze an organization as a complete and integrated system. It will cover the dynamic world of business, the nature of managerial work, planning and decision making, organization structure and design, individual responsibility. Upon successful completion of this course the students will be able to describe the key elements of the business organization, provide a critical perspective on the main functional areas of management, build a foundation of knowledge on the different theoretical approaches to management and decision making, develop analytical skills to identify the links between the functional areas in management, organizations, management practices and the business environment

Pre-requisites: Knowledge of English

Unit -I

Introduction [11 hrs]
Management Definition, Concepts of Management, Management and Administration, Functions of Manager in the Information age, Science, theory and practice of Management - Managerial objectives and Role, Management Thoughts Evolution, Business Environment, Attitudes beliefs and Values of Society, Social Responsibilities of Business

Management Functions [11 hrs]
Introduction to Unit, Planning, Nature and importance, Planning Steps, Organizing and its process, Staffing, Systems & Approach, Directing; Controlling and its process, Decision Making

Motivation [10 hrs]
Introduction to Unit , Meaning & need for motivation, Motivation Theories, Leadership – Meaning and styles, group and team working, HRM.

Unit-II

Functional Areas [10 hrs]
Introduction to Unit , Marketing - Market and Environment, Consumer / buyer behavior, marketing mix, Advertisement and sales Promotion, Financial Management – Introduction to Book keeping and financial statements, Break Even analysis

Upcoming Trends in Management [10 hrs]
Introduction to Unit, Production and Productivity, Production Planning and Control, TQM, Globalization and WTO, Business process reengineering, IT in Management, Outsourcing

Reference Book:

1. R K Singh, Business Organization by, VK Publications

CA16** **(4L hrs/week)**

ELECTIVE –II

[TO BE CHOSEN FROM LIST OF ELECTIVES FOR VI SEMESTER]

DEPARTMENT OF COMPUTER APPLICATIONS

CA1672 **(4L hrs/week)**

PROJECT AND VIVA VOCE

CA1651 **(4L hrs/week)**

REASONING AND THINKING (PART II)

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: This course covers some basic things of verbal ability, some topics of quantitative aptitude and idea of logical reasoning. It will help students in placements.

Pre-requisites: Knowledge of basic formulas

Unit-I

Logical Reasoning – II [6 hrs]
Recap on Reasoning and Thinking -I,

Blood Relations [6 hrs]
Concept of a statistical population and sample from a population; qualitative and quantitative data

Averages [7 hrs]
Objective of averaging, characteristics of good average, types of average, arithmetic mean of grouped and ungrouped data, correcting incorrect values, weighted arithmetic mean

Median [7 hrs]
Median of grouped and ungrouped data merit and limitation of median, computation of quartile, decile and percentile

Unit-II

Mode [13 hrs]
Calculation of mode of grouped and ungrouped data, merits and limitation of mode, relationship between mean, median and mode. Geometric mean and Harmonic mean.

Presentation of Data [13 hrs]
Construction of tables with one or more factors of classification; Diagrammatic and Graphical representation of non-frequency data; Frequency distribution, cumulative frequency distribution and their graphical representation - histogram, Column Graphs, Bar Graphs, Line Charts, Pie Chart, Data Interpretation – Introduction and approaches

Reference Books:
1. Richard I Levin, David S. Rubin: Statistics for Management, PHI.
2. Bajpai, N. Business Statistics, Pearson,
3. Sharma J.K., Business Statistics, Pearson.
4. Anderson; David R, Dennis J. Sweeney and Thomas A. Williams, Quantitative Methods for Business, PHI.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1652 **(4L hrs/week)**

MOBILE, WIRELESS AND VOIP SECURITY

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: Basic understanding of security in wireless world is very important for any IT Security Professional. As organizations are increasingly adapting VoIP for converged messaging, call centres and interactive multimedia collaboration, implementing security principles is vital for maintaining confidentiality and privacy
Pre-requisites: Knowledge of fundamentals of Security

Unit- I

Introduction to Mobile communication [13 hrs]
Mobile & Telecommunication protocols and their vulnerabilities, Gain knowledge of managerial, technical and procedural controls to address Mobile & Telecommunication vulnerabilities

Wireless Security [13 hrs]
Wireless protocols and their vulnerabilities, Gain knowledge of managerial, technical and procedural controls to address Wireless vulnerabilities

Unit-II

Voice over Internet Protocol (VOIP) Security [13 hrs]
VOIP concepts, protocols and vulnerabilities, Gain knowledge of managerial, technical and procedural controls to address VOIP vulnerabilities

Mobile Forensics & Data Extraction [13 hrs]
Mobile forensics process including seizure, data acquisition types like Physical, Logical, Manual, External & Internal memory, storage, analysis using tools & techniques

Books for Reference

1. Nina Godbole, Information Systems Security: Security Management, Metrics, Frameworks and Best Practices , Wiley.

DEPARTMENT OF COMPUTER APPLICATIONS

CA1653 **(4L hrs/week)**

ITIL

No. of questions to be set: 4 each from Unit– I and Unit–II
No. of questions to be answered: Any Five selecting at least TWO from each UNIT

Objectives: ITIL-compatible tools offer better integration, interaction and compatibility with your global partners, and in addition, sticking to strict ITIL standards from a single vendor can help process integrations go seamlessly and ensure all parties are speaking the same technical language.
It is always an advantage to understand what types of ITIL tools your global partners are working with and how they rate them. ITIL frameworks provide a homogenous IT environment and eases interactions with other global companies using similar preapproved tools. Managing staff, providing services to customers and creating efficiencies for less money can be daunting tasks for any IT organization.

Pre-requisites: Knowledge of computer

Unit-I

ITIL Overview [6hrs]
ITIL History, Components of the ITIL Library, IT Service Management, Organizing for IT Service Management, Technology and Architecture, Overview of HPSM and OTRS as service management tool.

Service Strategy [6hrs]
Service Strategy Lifecycle Stage, Service Portfolio Management, the Demand Management Process, the IT Financial Management Process, Introduction to ISO 20000 Standards.

Service Design [8hrs]
Service Design Lifecycle Stage, The Service Catalog Management Process, The Service Level Management Process, The Availability Management Process, The Capacity Management Process, The Information Security, Management Process, The IT Service Continuity, Management Process, The Supplier Management Process.

Service Transition [6hrs]
Service Transition Lifecycle Stage, the Change Management Process, the Release and Deployment Management Process, the Service Asset and Configuration Management Process, Knowledge Management

Unit-II

Service Operation [6hrs]
Service Operation Functions-Service Operation Lifecycle Stage, The Service Desk Function, The Technical Management Function, The Application Management Function, The IT Operations Management Function.

Service Operation Processes [6hrs]
The Event Management Process, The Incident Management Process, The Request Fulfilment Process, The Access Management Process, The Problem Management Process.

Continual Service Improvement [8hrs]
Continual Service Improvement principles - CSI and organizational change, Ownership, Role definitions , External and internal drivers , Service Level Management, The Deming Cycle, Service measurement ,Knowledge Management, Benchmarks, Governance, Frameworks, models, standards and quality systems

Continual Service Improvement processes [6hrs]
7step improvement process, Service reporting, Service management, return on in investment for CSI, business questions for CSI, Service level management

Text Books:

1. Introduction to ITIL, Van Haren publishing.
2. Donna Knapp , A Guide to Service Desk Concepts , Cengage Learning.
3. Christian Jacquenet, Gilles Bourdon, Mohamed Boucadair , Service automation and dynamic provisioning techniques in IP/MPLS environments , Wiley.