

Master of Computer Applications

Programme Code: MCA

Duration – 3 Years Full Time

**Programme Structure
and
Curriculum & Scheme of Examination**

**2017
(Choice Based Credit System)**

**AMITY UNIVERSITY
RAJASTHAN**

PROGRAMME STRUCTURE

FIRST SEMESTER

Code	Course	CATEGORY	L	T	P/FW	CREDITS
MCA101	System Analysis & Design	CC	2	1	-	3
MCA102	Computer Programming Using C Language	CC	3	1	-	4
MCA103	Graph Theory & Combinatorics	CC	2	1	-	3
MCA104	Database Management System	CC	2	1	-	3
MCA105	Computer Organization & Architecture	CC	2	1	-	3
MCA106	Mathematical Foundation to Computer Science	CC	2	1	-	3
MCA120	Computer Programming Using C Language Lab	CC	-	-	2	1
MCA121	Database Management System	CC	-	-	2	1
DE Electives: Student has to select 1 course from the list of following DE electives						
MCA110	Cyber Security	DE	2	1	-	3
MCA111	Financial Accounting	DE				
MCA112	Introduction to IT	DE				
MCA113	Principles of Management	DE				
VALUE ADDED COURSES						
BCS111	Communication Skills – I	VA	1	-	-	1
BSS111	Behavioural Science – I	VA	1	-	-	1
FLF111	Foreign Language – I	VA	2	-	-	2
FLG111	French-I					
FLS111	German-I					
FLC111	Spanish-I					
	Chinese-I					
TOTAL						28

SECOND SEMESTER

CODE	COURSE	CATEGORY	L	T	P/FW	CREDITS
MCA201	Data Structures Using C Language	CC	3	1	-	4
MCA202	Operating System	CC	2	1	-	3
MCA203	Data communication and Computer Networks	CC	3	1	-	4
MCA204	Computer Oriented Numerical Analysis	CC	3	1	-	4
MCA205	Optimization Techniques	CC	3	1	-	4
MCA220	Data Structures Using C Language Lab	CC	-	-	2	1
DE Electives: Student has to select 1 course from the list of following DE electives						
MCA210	Management Information System	DE	2	1	-	3
MCA211	Web Technologies	DE				
MCA212	Organization Behavior	DE				
MCA213	Advanced Computer Architecture	DE				
MCA214	Embedded Systems	DE				
OPEN ELECTIVES						
	Open Electives	OE	2	1	-	3
VALUE ADDED COURSES						
BCS211	Communication Skills – II	VA	1	-	-	1
BSS211	Behavioural Science – II	VA	1	-	-	1
FLF211	Foreign Language-II	VA	2	-	-	2
FLG211	French-II					
FLS211	German-II					
FLC211	Spanish-II					
	Chinese-II					
TOTAL						30

THIRD SEMESTER

CODE	COURSE	CATEGORY	L	T	P/FW	CREDITS
MCA301	Computer Graphics	CC	2	1	-	3
MCA302	Object Oriented Programming with C++	CC	2	1	-	3
MCA303	Core Java	CC	2	1	-	3
MCA360	Summer Project – I (Evaluation)	CC	-	-	-	6
MCA320	Computer Graphics Lab	CC	-	-	2	1
MCA321	Object Oriented Programming with C++ Lab	CC	-	-	2	1
MCA322	Core Java Lab	CC	-	-	2	1
DE Electives: Student has to select 1 course each from the list of following DE electives I & II						
Elective-I (Without Lab)	Select any ONE					
MCA310	Fundamentals of E-Commerce	DE	2	1	-	3
MCA311	Accounting & Financial Management	DE				
MCA312	Parallel Processing	DE				
MCA313	Advanced Database Concepts	DE				
MCA314	Mobile Computing	DE				
MCA315	Theory of Computation	DE				
Elective-II (WithLab)	Select any ONE					
MCA330	C# (C Sharp) with GUI	DE	2	1	-	3
MCA331	Photoshop	DE				
MCA332	Data Ware Housing and Mining	DE				
MCA333	Network Fundamentals	DE				
MCA323	C# (C Sharp) with GUI Lab	DE	-	-	2	1
MCA324	Photoshop Lab	DE				
MCA325	Data Ware Housing and Mining Lab	DE				
MCA326	Network Fundamentals Lab	DE				
OPEN ELECTIVES						
	Open Elective	OE	2	1	-	3
VALUE ADDED COURSES						
BCS311	Communication Skills – III	VA	1	-	-	1
BSS311	Behavioural Science – III	VA	1	-	-	1
FLF311 FLG311 FLS311 FLC311	Foreign Language – III French-III German-III Spanish-III Chinese-III	VA	2	-	-	2
	TOTAL					32

FOURTH SEMESTER

CODE	COURSE	CATEGORY	L	T	P/FW	CREDITS
MCA401	Software Engineering	CC	2	1	-	3
MCA402	Unix & Shell Programming	CC	2	1	-	3
MCA403	Open Source Technologies	CC	2	1	-	3
MCA404	Distributed Operating System	CC	2	1	-	3
MCA420	Software Engineering Lab	CC	-	-	2	1
MCA421	Unix & Shell Programming Lab	CC	-	-	2	1
MCA422	Open Source Technologies Lab	CC	-	-	2	1
DE Electives: Student has to select 1 course each from the list of following DE electives I & II						
Elective-I (Without Lab)	Select any ONE					
MCA410	Enterprise Resource Planning	DE	2	1	-	3
MCA411	Software Project Management	DE				
MCA412	Business Intelligence and its Applications	DE				
MCA413	Windows Programming using VC++	DE				
MCA414	Real Time Systems	DE				
Elective-II (With Lab)	Select any ONE					
MCA430	ASP.NET	DE	2	1	-	3
MCA431	Flash	DE				
MCA432	Advance JAVA	DE				
MCA433	Advanced DBMS	DE				
MCA434	Routing Protocols and Concepts	DE				
MCA435	Game Programming using Greenfoot	DE				
MCA423	ASP.NET Lab	DE	-	-	2	1
MCA424	Flash Lab	DE				
MCA425	Advance JAVA Lab	DE				
MCA426	Advanced DBMS Lab	DE				
MCA427	Routing Protocols and Concepts Lab	DE				
MCA428	Game Programming using Greenfoot Lab	DE				
OPEN ELECTIVE						
	Open Elective	OE	2	1	-	3
VALUE ADDED COURSES						
BCS411	Communication Skills – IV	VA	1	-	-	1
BSS411	Behavioural Science – IV	VA	1	-	-	1
	Foreign Language – IV	VA	2	-	-	2
FLF411	French- IV					
FLG411	German- IV					
FLS411	Spanish- IV					
FLC411	Chinese- IV					
	TOTAL					29

FIFTH SEMESTER

CODE	COURSE	CATEGORY	L	T	P/FW	CREDITS
MCA501	Artificial Intelligence	CC	2	1	-	3
MCA502	Information Storage Management (EMC ²)	CC	2	1	-	3
MCA560	Summer Project – II (Evaluation)	CC	-	-	-	6
MCA561	Minor Project	CC	-	-	-	5
DE Electives: Student has to select 1 course each from the list of following DE electives I & II						
Elective-I (Without Lab)	Select any ONE					
MCA510	Big data Analytics	DE	2	1	-	3
MCA511	Accessing the WAN	DE				
MCA512	Cloud Computing	DE				
MCA513	PHP	DE				
MCA514	Post RDBMS with CACHE	DE				
MCA515	Software Testing & Quality Assurance	DE				
Elective-II (With Lab)	Select any ONE					
MCA530	Digital Image Processing	DE	2	1	-	3
MCA531	Dreamweaver	DE				
MCA532	Oracle	DE				
MCA533	LAN Switching and Wireless	DE				
MCA534	Android Programming	DE				
MCA520	Digital Image Processing Lab	DE				
MCA521	Dreamweaver Lab	DE				
MCA522	Oracle Lab	DE				
MCA523	LAN Switching and Wireless Lab	DE				
MCA524	Android Programming Lab	DE				
OPEN ELECTIVE						
	Open elective	OE	2	1	-	3
VALUE ADDED COURSES						
BCS511	Communication Skills – V	VA	1	-	-	1
BSS511	Behavioural Science – V	VA	1	-	-	1
	Foreign Language – V	VA	2	-	-	2
FLF511	French- V					
FLG511	German- V					
FLS511	Spanish- V					
FLC511	Chinese- V					
	TOTAL					31

SIXTH SEMESTER

CODE	Course	CATEGORY	L	T	P/FW	CREDITS
MCA661	Dissertation / Project Work	CC	-	-	-	30
	TOTAL					30

SYSTEM ANALYSIS AND DESIGN

Code	L	T	P/FW	CREDITS
MCA101	2	1	-	3

Course Objective:

This course introduces the fundamentals of information systems analysis and design by covering a variety of current methods, tools, and techniques. The course will cover system development activities in the context of when they typically occur. Most of the course will be devoted to learning and practicing the techniques and processes used by the systems analyst at each phase within the systems development cycle and to working as a team to create a system solution for a client.

Course Contents:

Module I: System Concepts

The System Concept, Definition, Characteristics of a System, Elements of a System, Types of Systems, Information.

Module II: System Development Life Cycle

Definition, Problem Recognition, Feasibility Study, System Analysis, System Design, Coding and Testing, Implementation, Post Implementation and Maintenance.

Module III: Feasibility Study

Definition, Types of Feasibility, Feasibility Checkpoints in the Life Cycle, Feasibility Report, Cost/Benefit Analysis, Case Studies.

Module IV: System Analysis

System Planning, Role and Task of System Analyst, Information Gathering, Information Sources, Information Gathering Tools, Review of Literature, Procedure, Onsite Observation, Interviews and Questionnaire, Tools of Structured Analysis, What is Structure Analysis? DFD, Data Dictionary, Decision Tree, Decision table, Structured English, Exercises.

Module V: System Design

Stages of System Design, Program Design, Input Output and Forms Design, File Design, Database Design

Module VI: System Testing and Quality Assurance

Testing, Types of testing, Test plan, Testing Principles, Quality assurance goals in the System Life Cycle, Levels of Quality assurance, Quality Assurance Activities

Module VII: Implementation and Software Maintenance

Introduction, conversion, Review Plan, Primary activities for maintenance, reducing maintenance cost

Module VIII: Hardware / Software Selection

Criteria for selection, The procedure for Hardware/Software selection, The Examination process, Financial consideration in selection.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- System Analysis and Design, Elias M Awad, Galgotia Publication (P) Ltd. – II Edition
- Analysis and Design of Information System, V Rajaraman, Prentice Hall of India Pvt. Ltd.

References:

- System Analysis and Design, Don Yeates, Maeiua Shietls and Dand Helmg, Macmillan India Ltd

COMPUTER PROGRAMMING USING 'C' LANGUAGE

Code	L	T	P/FW	CREDITS
MCA102	3	1	-	4

Course Objective:

This course provides an introduction to ANCI C, focusing on the C programming. Feature, syntax, structure and implementation will be covered. Lab instructions will be included, which will provide straight understanding and excises of C. Functions, Array, Pointer and File System are the important contents of the syllabus.

Module I

Introduction to C :Structure of C program, Executing a C program, Character Set, Identifier and Keywords, Data Types and Constants, Variables

Operators and Expressions :Arithmetic Operator, Relational Operator, Logical Operator, Unary Operator, Assignment Operator, Bitwise Operator, Special Operator, Conditional Operator

Data Input/Output Functions :Description of getchar () FUNCTION, Description of putchar () Function, Description of scanf () Function, Description Of printf () Function, Description of Gets () Function, Description of Puts () Function, Commonly used I/O library functions.

Module II

Control Statements :Preliminaries, Decision Making with If Statement, The Switch Statement, Looping Statements (While, Do-While, For), Break And Continue Statement, goto Statement

Array :Defining an Array, Processing an Array, Passing an Array to a Function, Single Dimensional Arrays, Multidimensional Arrays, Handling of character string, String library functions.

Module III

Pointers : Fundamentals of Pointers, Declaration of a Pointer Variable, Pointers and Array, Array of pointers, Pointer to Pointer, Pointer and String, void Pointer, Application of pointer, Dynamic Memory Allocation

Functions : Introduction to Functions, Necessity Of Functions, Defining and Accessing Functions, Prototype of a Function, Passing Arguments and Receiving Values from Functions, Call by Value and Call by Reference Function, Recursion, Pointer to function

Module IV

Structure and File Management

Structure , Unions , Enumerations and typedef :Definition, Processing of Structure, Array of Structure, Structure and Pointers, Passing Structure to Functions, structure within structure, Union, typedef, Enumerated data types, bit field.

Opening and Closing Data Files, Creating a Data File, difference between text mode and binary mode, other file functions, Command line arguments.

Examination Scheme:

Components	CT	HA/V/Q	ATTD.	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Programming in ANSI C, E Balaguruswamy, TMH
- Let Us C, Y. Kanetkar, BPB

References:

- The 'C' Programming Language, B.W. Kernighan & Ritchie, PHI
- Programming in 'C', Gottfried, TMH

GRAPH THEORY AND COMBINATORICS

Code	L	T	P/FW	CREDITS
MCA103	2	1	-	3

Course Objective:

We will study basic concepts in combinatorial graph theory and see how graphs serve as models for many standard problems, which have applications in science, business and industry. Syllabus includes mathematical logic, algebraic structure, graph, tree and Combinatorics.

Course Contents:

Module I: Mathematical Logic

Statements and notations, connectives, Conditional Statements, Compound Statements, Truth Tables, Statement Formula, Well Formed Formula, Equivalence of Formula, Tautology, Rules of inference.

Module II: Algebraic Structure

Algebraic Systems, General properties, Semi Group, Monoid and group, Boolean algebra, Boolean function, Representation and Minimization of Boolean function, Applications of Boolean Algebra, Lattices.

Module III: Graph Theory

Basic Terminology, Walks, paths, circuits, connectedness, Handshaking Lemma, Isomorphism, Sub graphs, and Union of Graphs, Reach ability, Eulerian Graph and Union of Graphs, Reachability, Eulerian Graph, Flurry's Algorithm, Shortest path problem, Chinese postman problem, Hamiltonian graph, Traveling Salesman Problem, Bipartite graphs.

Module IV: Trees

Introduction to trees, Rooted trees, path length in rooted trees, spanning trees, Fundamental circuits, spanning trees of a weighted graph, cut sets and cut vertices, Fundamental cut-set, Minimum spanning tree.

Module V: Directed Graph

Directed graphs and connectedness, directed trees, Network Flows, Max Flow-MinCut Theorem, Matrix representation of a graph, Planar graphs: Combinational and Geometric Duals, Kuratowski's graphs, Detection of planarity, thickness and crossing.

Module VI: Combinatorics

Partitions, counting functions, number of partitions into odd or unequal parts. Necklaces, Euler's function, set of symmetries, enumeration in the odd and even cases.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Discrete Mathematical Structures with Application to Computer Sciences, JP Trembly& Manohar, TMH.
- Elements of Discrete Mathematics, CL Lire, TMH

References:

- Discrete Mathematical Structures, SernardKolman and Others, PHI
- Applied Discrete Structures for Computer Science, AlenDoerr&Levasseur, Galgotia

DATABASE MANAGEMENT SYSTEMS

Code	L	T	P/FW	CREDITS
MCA104	2	1	-	3

Course Objective:

The primary aim of the subject is to provide the students a deeper understanding of the relational database model by exposing the students to a variety of important issues of data base management, e.g., database design, physical storage, query optimization, database recovery, concurrency control, security and data integrity.

Course Contents:

Module I: Introduction

Introduction to DBMS : Introduction to DBMS, Architecture of DBMS, Components of DBMS, Traditional data Models (Network, Hierarchical and Relational), Database Users, Database Languages, Schemas and Instances, Data Independence

Data Modeling : Concepts of Entity-Relationship Diagram(ERD), Entity sets, attributes, keys and Relationships, Degree and Cardinality, Weak and Strong entity types, Enhanced entity-relationship (EER), Specialization and generalization, Aggregation, Reduction of ERD to tables.

Module II:RDBMS

Relational Database Model

Basic Definitions, Properties of Relational Model, Keys, Constraints, Integrity rules, Relational Algebra, Relational Calculus.

Relational Database Design

Functional Dependencies, Normalization, Normal forms (1st, 2nd, 3rd, BCNF), Lossless decomposition, Join dependencies, 4th & 5th Normal form.

Module III: SQL

Structured Query Language : Objects in Oracle , SQL Components (DDL, DML, DCL), SQL Data Definition and Data Types, Specifying Basic constraints in SQL, Schema change statement (Alter, Drop) Basic queries in SQL ts (Select...from...where.... group by.... having.... order by...), More complex queries in SQL (Joins, Sub-queries, Correlated query), DML (Insert, Update, Delete, Merge), Transaction Control Language (TCL), Data Control Language (DCL), Views.

Module IV: TRANSACTIONS

Transaction concept : States, Implementation of Atomicity and Durability, Concurrent Executions, Conflict & View Serializability, Concurrency Control, Granting of Locks, Two Phase Locking Protocol.

Module V: PL/SQL

Introduction, Basic block, Structure of PL/SQL program, Control Statements, Exception handling, Cursor Concept, Procedure, functions and triggers.

Examination Scheme:

Components	CT	HA/V/Q	ATTD.	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Fundamental of Database Systems, Elmasri & Navathe, Pearson Education, Asia
- Data Base Management System, Leon & Leon, Vikas Publications
- Database System Concepts, Korth & Sudarshan, TMH

References:

- Introduction to Database Systems, Bipin C Desai, Galgotia

- Oracle 9i The Complete Reference, Oracle Press

COMPUTER ORGANIZATION AND ARCHITECTURE

Code	L	T	P/FW	CREDITS
MCA105	2	1	-	3

Course Objective:

This course is an introduction to computer architecture and organization. We will cover topics in both the physical design of the computer (organization) and the logical design of the computer (architecture). We will also review digital logic, the development of integrated circuits, and cover selected topics in advanced technologies in this area.

Course Contents:

Module I: Digital Logic Fundamentals & Register Transfer Language

Boolean Algebra: Basic Functions, Manipulating Boolean functions, Basic Combinational Logic: Adder/ Subtractor, Decoders, Encoders, Multiplexers, Memory, Basic Sequential Circuits: Flip-flops, Registers, Counters
Register Transfer Language: Computer Registers, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic shift Unit.

Module II: Basic Computer Organizations and Design

Instruction Codes, Computer Instructions, Instruction Formats, Instruction type, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Design of Accumulator Logic.
Hardwired and Micro programmed control: Control Memory, Address Sequencing, Design of Control Unit

Module III: Central Processing Unit

Introduction: General Register Organization, Stack Organization, Instruction representation, Addressing Modes, Data Transfer and Manipulation, Program Control
Computer Arithmetic: Introduction, Addition, Subtraction, Multiplication Algorithms

Module IV: Memory and Input-Output Organization

I/O devices: Accessing, I/O interfaces, Asynchronous data transfer: Strobe control, handshaking, Modes of transfer: Programmed I/O, Interrupt-initiated I/O, DMA, Interrupts: types, interrupt hardware
Memory Organization: Memory Hierarchy, Main memory: RAM and ROM, Memory Address Map, Auxiliary Memory: Mag tape, Mag Disk, RAID, Cache Memory: associative memory.

Module V: Pipelining, Vector Processing and Multiprocessors

Reduced Instruction Set Computers: RISC Vs CISC, Pipelining: Parallel processing, arithmetic pipeline, Instruction pipeline, RISC pipeline, Vector processing: Vector operation, array processors.

Examination Scheme:

Components	CT	HA/V/Q	ATTD.	EE
Weightage (%)	15	10	5	70

Text & References:

Text :

- Morris Mano, *Computer System Architecture*, 3rd ed. (2009), Prentice-Hall of India Pvt. Ltd.

Reference:

- Harry & Jordan, *Computer Systems Design & Architecture*, 3rd ed. (2007), Addison Wesley, Delhi
- P.V.S. Rao, *Computer System Architecture*, 1st ed.(2009), Prentice-Hall of India Pvt. Ltd.
- William Stallings, *Computer Organization and Architecture*, 4th Ed. (2000), Prentice-Hall of India Pvt. Ltd.
- Kai Hwang & Faye A Briggs, *Computer Architecture & Parallel Processing*, 3rd ed. (1997), McGraw Hill, inc.,
- John D. Carpinelli, *Computer system Organization & Architecture*, 2nd ed. (2001), Addison Wesley, Delhi

MATHEMATICAL FOUNDATION TO COMPUTER SCIENCE

Code	L	T	P/FW	CREDITS
MCA106	2	1	-	3

Course Objective:

The aim of the course is to introduce the mathematical underpinnings of theoretical computer science and the theory of computation. Fundamental concepts in discrete mathematics with emphasis on their applications to computer science will be taught.

Course Contents:

Module I

Set Theory: Definition, Types of sets, equality of sets, Subset, Power Set, Universal set, Union, intersection and complement of sets, Algebra of sets, Venn diagram, Application of set theory, Cartesian product of sets, Cardinality. Mathematical Induction: Peano's axioms, Mathematical Induction, Discrete Numeric Functions and Generating Functions, Recurrence Relation.

Module II

Relation: Relation as Cartesian product of sets, types of relations, Composition of relations, Pictorial representation of relations, equivalence relation, Partial order relation.

Functions: Definition, Types of Functions (one-one function, onto function, one-one into function, one-one onto function, inverse of a function), Composite of functions, Recursive Defined Function, Mathematical Functions and Computer Science.

Module III

Algebraic Functions: Properties, Semi group, Monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Permutation group, Homomorphism, Isomorphism and Automorphism of groups.

Module IV

Matrix: Definition, Types of Matrices, Algebra of Matrices, Multiplication of Matrices, Transpose of Matrix, Elementary Operations, System of Linear Equations, Inverse of Matrix, Gauss Elimination Method, Determinant, Minors, Cofactors, Cramer's Rule for Solution of Linear Equations.

Propositional Logic: Proposition, First order logic, Basic Logical operations, Tautologies, Contradictions, Algebra of Proposition. Logical implications and Double implications, Arguments.

Module V

Counting Principle: Counting Principle, Factorial Function, Binomial Theorem and Binomial Coefficient, Pascal's Triangle, Permutations, Permutation with Repetition, Combinations, Ordered and Unordered Permutations, Tree Diagram.

Examination Scheme:

Components	CT	HA/V/Q	Attnd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Lipschutz, Seymour, "Discrete Mathematics", TMH.

References:

- Trembley, J.P & R. Manohar, "Discrete Mathematical Structures with Application to Computer Science", TMH
- Kenneth H. Rosen, "Discrete Mathematics and its applications", TMH.
- Doerr Alan & Levasseur Kenneth, "Applied Discrete Structure for Computer Science". Galgotia Pub Pvt Ltd.
- Gersting, "Mathematical Structure for Computer Science", WH Freeman & M Macmillan.
- Kumar Rajendra, "Theory of Automata : Language and Computation", PPM.
- C.L. Liu, "Elements of Discrete Mathematics", McGraw Hill.
- Peter Grossman, "Discrete Mathematics for Computer ", Palgrave Macmillan.

COMPUTER PROGRAMMING USING C LANGUAGE LAB

Code	L	T	P/FW	CREDITS
MCA120	-	-	2	1

List of Experiments

1. Write a program to read 3 numbers x, y, z. Use conditional statement and evaluate values of variables a, b and c. Perform the sum with 2 set of variable. Check the sum for equality and print the sum.
2. Write a program to shift input data by 2 bits left and right.
3. Write a program to use bitwise "&" operator between 2 integer and display the result.
4. Write a program to input 6 numbers and find the biggest and smallest using nested if.
5. Write a program to enter a year and find the number of:
 - a. Minutes
 - b. Hours
 - c. Days
 - d. Months
 - e. Seconds
6. Write a program to find the sum of even and odd numbers using switch, if, if..else, nested if between 1 and 20.
7. Write a program to find the numbers between 1 and 100 that are not divisible by 2, 3 and 5.
8. Write a program to enter a character (alphabetical) and display its position and its corresponding ASCII value.
9. Write a program to simulate a digital clock.
10. Write a program to find the sum of its digits till the result is in single digit.
11. Write a program to print the series:
 - a. $x - x^3/3! + x^5/5! - x^7/7! \dots x^n/n!$
 - b. $1 + x^2/2! - x^3/3! + x^4/4! \dots x^n/n!$
12. Write a program to generate the following figures:

a.

```

*
 * *
* * * *
 * * * *
 *
```

b.

```

      *
     * *
    * * *
   * * * *
  * * * * *
```

c.

```

1
12
123
1234
12345
```

d.

```

      1
     121
    12321
   1234321
  123454321
```

e.

```

1
12
123
1234
12345
1234
123
12
1

```

f.

```

654321
54321
4321
321
21
1
```

g.

```

543212345
5432 2345
543 345
54 45
5 5
```

h.

```

z
zyz
xyzyx
zyz
z
```

i. Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj Kk Ll.....

13. Write a program to find the factorial of a given number.
14. Write a program to obtain the sum of the diagonal elements of matrices.
15. Write function to add, subtract, multiply & divide two complex numbers (x+iy) & (a+ib).
16. Write a program to find the roots of a quadratic equation with each condition.
17. Write a program to find numbers between 7 and 100 which is exactly divisible by 4 and is divisible by either 5 or 6.
18. Write a program to convert:
 - a. Binary to Decimal
 - b. Decimal to Binary
 - c. Binary to Hexadecimal
19. Write a program to perform Arithmetic operation on an array i.e. Addition, Subtraction, Multiplication and Division and store the result in another array.
20. Write a program to perform following string operation: with string functions & without string functions

- a. Reverse a string
 - b. Concatenate 2 string – strcat()
 - c. Compare 2 string – strcmp(), strcmpi()
21. Write a program to detect the occurrence of a number in a string.
 22. Write a program to accept a string up to 15 character, and display the position of a character in a separate line.
 23. Write a program to display and count the number of vowels in a string.
 24. Write a program to generate a palindrome.
 25. Write a program to add to pointer addresses of a pointer variable.
 26. Write a program to find the factorial of a number using recursion.
 27. Write a program to perform different arithmetic operations using pointers
 28. Write a program to obtain prime factors of any integer number using functions i.e. 24 -> 2, 2, 2, & 3.
 29. Write a program to find the sum of 5 digit number:
 - a. Without using recursion
 - b. With using recursion.
 30. Write a program to obtain Fibonacci series by using recursion.
 31. Write a program to create, display, modify and append a file (sequential file).
 32. Write a program to copy the content of one file to another.
 33. Write a program to calculate space in a file (number of blank spaces and not the file size).
 34. Write a program to print out the lines from a file that have 50 or more characters in them.
 35. Write a program to extract the content from a file and print them. The user should be able to specify the starting position from where the extraction should begin and the number of characters to be extracted.
 36. Write a program to create a structure to accept Firstname, Middlename, Lastname of a person. Display the initials of first and the middle name separated by “.” i.e.

Input – Krishna Kumar Singh
Output – K.K. Singh

Now create a main structure that will contain name, age, salary of an employee.
 37. Write a program to call sum() function recursively and perform sum of 1 to 5 numbers. (instead of using the sum() function use the main() function itself to perform the above operation)
 38. Write a program to find the larger of the two numbers using macro with arg.
 39. Write a program to count the number of character, word and lines in a text file whose name is supplied in the command line.
 40. Write a program to arrange a list by using any sorting method.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

DATABASE MANAGEMENT SYSTEM LAB

Code	L	T	P/FW	CREDITS
MCA121	-	-	2	1

List of Experiments

1. Create the following(s) table
 Salespeople with fields snum, sname, city, commission
 Orders table with fields onum, odate, snum, amt
 Customers table with fields cnum, cname, city, rating, snum
2. Display name & city of salesman where city is "Pune"
3. Display the numbers of sales persons, with orders currently in the orders table without any repeats.
4. Display all customers where city is 'Mumbai' rating is more than 100.
5. Display all customers where city is either 'Pune' or 'Mumbai'
6. List all customers not having city 'Pune' or rating more than 100
7. Display all customers excluding those, with rating less than equal to 100, unless they are located in 'Nagar'
8. Display all sales persons names starting with character 'G', the 4th character is 'A' & the rest of characters will be any.
9. Find all records from customers table where city is not known i.e. NULL.
10. Assume each salesperson has a 12% commission on order amt. Display orderno, snum, commission for that order.
11. Display the count of snum in order table without duplication of snum.
12. Display the counts of all orders for Feb05
13. Display the maximum outstanding amount as blnc+amt
14. Display details of orders order number & date wise
15. Display customers highest ratings in each city.
16. Write a query that totals the orders for each day & places the results in descending order.
17. Add a column curr_bal in orders table for current balance
18. Increase commission of all sales persons by 200.
19. Display each order number followed by the name of customer who made it.
20. Calculate the amount of salespersons commissions on each order by a customer with a rating above 100.
21. Write a query that uses a sub-query to obtain all orders for the customer named 'Gopal'.
22. Write a query that produces the names & ratings of all customers who have above-average orders
23. Create a union of two queries that shows the names, cities & ratings of all customers. Those with a rating of 200 or greater will also have ratings "high rating", while the others will have the words "low rating".
24. Write a command that produces the name & number of each salesperson & each customer with more than one current order. Put results in alphabetical order.
25. Create an index that would permit each salesperson to retrieve his or her orders grouped by date quickly.
26. Create a view that shows all of the customers who have highest ratings.
27. Create a view that shows number of salespeople in each city.
28. Write a PL/SQL program to display the number in reverse order
29. Write a PL/SQL program to find the factorial of a given number
30. Write a PL/SQL program to generate fibonacci series
31. Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 3 to 7. Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns radius & area table name: areas radius area
32. Write a PL/SQL code block that will accept an account number from the user, check if the users balance is less than minimum balance, only then deduct rs.100/- from the balance. This process is fired on the acct table.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

CYBER SECURITY

Code	L	T	P/FW	CREDITS
MCA110	2	1	-	3

Course Objective:

The goal of the Cyber Security course is to provide an awareness of cyber threats and vulnerabilities, risk factors present in the cyber world. It will provide the student with basic knowledge of cyber crime dynamics and is aware to the students desiring Security Systems

Course Contents:

Module I: Introduction to Cyber Law.

Jurisprudence of Cyber Law, Overview of Computer and Web Technology, Introduction to Indian Cyber Law, Overview of General Laws and Procedures in India.

Module III: Information Technology Act 2000, Penalties and Offences.

The Information Technology Legal Framework in India, Cyber Crime, Digital Evidence, Structure of IT Act. Section 43 - Penalty and Compensation for damage to computer, computer system, Section 65 - Tampering with Computer Source Documents, Section 66 - Computer Related Offences, Section 66A - Punishment for sending offensive messages through communication service, Section 66C - Punishment for identity theft, Section 66D - Punishment for cheating by impersonation by using computer resource, Section 66E - Punishment for violation of privacy, Section-66F Cyber Terrorism and relative case study.

Module II: Computer Security.

Goals, Principles, Security Threat, Vulnerabilities, Attacks, Viruses, Bots, Rootkits, Intrusion Detection System, Malware.

Module IV: Information security

Introduction, The History of Information Security, Characteristics of Information Security, National Training Standard for Information Systems Security Professionals Security Model.

Module V: Information Technology Act Compliance

IT Act compliance for e-Commerce Sector, Education Sector, Healthcare Sector, Hospitality Sector, Outsourcing Sector, Retail Sector

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Rick Lehtinen and G.T. Gangemi, 2 edition, 2006, O'Reilly Media, Inc

References:

- McClure, Stuart & Scambray, Joel, et al (2005). Hacking Exposed 5th Edition. McGraw-Hill Osborne Media.
- Ortmeier, P. J. (2005). Security Management: An Introduction, 2nd edition, Prentice Hall.

FINANCIAL ACCOUNTING

Code	L	T	P/FW	CREDITS
MCA111	2	1	-	3

Course Objective:

The overall objective of this course is to train students in accounting terminology and methods so that they can interpret, analyze, and evaluate financial statements currently published in corporate annual reports. This course will also discuss the recent developments (and controversies) in accounting valuation and reporting practices. The latest accounting pronouncements, current topics, trends and techniques will be discussed in class.

Course Contents:

Module I: Introduction to Financial Accounting

Basic Accounting principles

Module II

Rules of Accounting, Ledgers, Vouchers, Trial Balance, Balance Sheet, profit and Loss A/c

Module III: Starting with Tally

Company Creation, Features, Configuration, Accounts Master, Accounts Vouchers, accounts reports, Inventory Master (Stock Category, Stock Group, Location, Units of Measurement, Stock Item)

Module IV

Inventory Vouchers, Inventory Reports, Printing Various Reports, Security Control, Backup and restoring Company

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Fundamentals of Management Accounting, P.K. Ghosh and G.S. Gupta

References:

- Tally Tutorial 6.3, K.K. Nadhani, BPB Publications

INTRODUCTION TO IT

Code	L	T	P/FW	CREDITS
MCA112	2	1	-	3

Course Objective:

This course is aimed to provide a fundamental understanding of computer science for the students in their early stages of academic career. Various computer nomenclatures regarding to hardware and software will be introduced for students to develop an in-depth realization of several subjects and their significant roles in the field. The syllabus includes the basic concepts of memory, processing units, Operating System, Computer Networks and Data Communications.

Course Contents:

Module I: Introduction to computers

Computer Basics

Algorithms, A Simple Model of a Computer, Characteristic of a Computer, Problem Solving Using a Computer, Generations of Computer Systems, Analog, Digital, Types of Computers (Micro, Mini, Main Frame) Systems, data representation.

Input output units , Computer Memory and processor

Description of Computer Input Units, Other Input Methods, Computer Output Units , Memory cells, Memory Organizations, Read only Memory, Physical devices used to construct Physical Memory, Hard Disks, Floppy Disks, CDROM, structure of Instruction, description of a processor, A machine language program, an algorithm to simulate the hypothetical computer.

Module II: Primary Arithmetic

Addition, Subtraction, Signed Numbers, Two's Compliment, Addition & Subtraction using 2's Compliment Method, Multiple & Division of Binary Numbers. Floating point Representation, Arithmetic Operations with Normalized Floating Point Numbers.

Module III: Introduction to Computer languages and Software

Introduction to Operating Systems

Why do we need Operating System. Batch Operating System, Multi Programming Operating System, Time Sharing Operating System. Personal Computer Operating System, The UNIX operating systems, Microkernel based operating system, Online and Real Time Systems, overview of Linux.

Computer languages

Why programming language? , Assembly language, higher level programming languages, Compiling high level language program, Some high level languages.

Module IV: Introduction to Networking Fundamentals

Voice and data communications

Type of Communication among Computers, Characteristics of communication Channel, Physical Communication Media, Public switched telephone networks, cellular communication system, Establishing Channel for communications, ATM networks

Computer networks

Need of computer Communication Network, Internet and World Wide Web, communication protocols, Local area networks, token ring local area network, Interconnecting networks, the future of internet technology.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text Book:

- Fundamentals of IT, Satish Jain, BPB Publication
- Fundamentals of Information Technology, D S Yadav, New Age Publication
- Computer Fundamentals, VRaja Raman

References Books:

- Computer Today, S. K. Basandra, Galgotia Publication

PRINCIPLES OF MANAGEMENT

Code	L	T	P/FW	CREDITS
MCA113	2	1	-	3

Course Objective:

The objective of this course is to expose to the theories of management, organizational theory, and the practice of management in contemporary organizations from a conceptual, analytical, and pragmatic perspective. It covers the basic functions of management: planning, organizing, leading, and controlling. Relevance of Computer Applications in Different Functional areas of Management, Decisions Making Process in the principles and role of leadership, communication, and motivation in the management teams.

Course Contents:

Module I: Conceptual Framework of Management

History and Foundations of Management, Components of Management, Distinguish between components like Features of Management, Functions of Management, Nature of Management, Levels of Management, Understand the interplay between management and administration, Appreciate the concept of management as a profession.

Module II: Evolution and Foundation of Management Theories

Introduction to various theories of management, The Classical Organization theory, Neoclassical Approach of theory, Implications of Hawthorne experiments, Systems Approach of Organization, Systems and Modern Organisational theories.

Module III: Study of Management Processes

Basically Planning, Organizing, Directing, Staffing, Communicating, Controlling, Coordinating, To understand the planning process, Its Objectives and Characteristics, Policy and its meaning, Procedure Defined.

Module IV: Types of Organisational Structures and Designs

Meaning and Definition of Organisation, Basic Elements / Steps/Features of an Organization, Characteristics of an Organisation, Formal and Informal Organisation, Functions and Design of an Organisation, Types of Organisations

Module V: Relevance of Computer Applications in Different Functional Areas of Management Viz

Financial Management, Materials Management, Production Management, Human Resources Management and Marketing Management.

Study of different Managements Structures, their Characteristics, Decision Making Techniques, Goals and Motivation and overview of behaviour study

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Management and Principles, Parag Diwan & L.N Agrawal.

References:

- Organisational Behaviour, Fred Luthans
- Principles and Practices of Management, L.M Prasad

COMMUNICATION SKILLS - I

Code	L	T	P/FW	CREDITS
BCS111	1	-	-	1

Course Objective:

The Course is designed to give an overview of the four broad categories of English Communication thereby enhance the learners' communicative competence.

Course Contents:

Module I: Listening Skills

Effective Listening: Principles and Barriers
Listening Comprehension on International Standards

Module II: Speaking Skills

Pronunciation and Accent
Reading excerpts from news dailies & magazines
Narrating Incident; Story telling.
Extempore & Role Plays

Module III: Reading Skills

Vocabulary: Synonyms, antonyms, diminutives, homonyms, homophones
Idioms & phrases
Foreign words in English

Module IV: Writing Skills

Writing Paragraphs
Précis Writing
Letter writing
Coherence and structure
Essay writing

Module V: Activities

News reading
Picture reading
Movie magic
Announcements

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Working in English, Jones, Cambridge
- Business Communication, Raman –Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge

BEHAVIOURAL SCIENCE - I

(SELF-DEVELOPMENT AND INTERPERSONAL SKILLS)

Code	L	T	P/FW	CREDITS
BSS111	1	-	-	1

Course Objective:

This course aims at imparting an understanding of:

- Self and the process of self exploration
- Learning strategies for development of a healthy self esteem
- Importance of attitudes and their effect on work behaviour
- Effective management of emotions and building interpersonal competence.

Course Contents:

Module I: Understanding Self

Formation of self concept

Dimension of Self

Components of self

Self Competency

Module II: Self-Esteem: Sense of Worth

Meaning and Nature of Self Esteem

Characteristics of High and Low Self Esteem

Importance & need of Self Esteem

Self Esteem at work

Steps to enhance Self Esteem

Module III: Emotional Intelligence: Brain Power

Introduction to EI

Difference between IQ, EQ and SQ

Relevance of EI at workplace

Self assessment, analysis and action plan

Module IV: Managing Emotions and Building Interpersonal Competence

Need and importance of Emotions

Healthy and Unhealthy expression of emotions

Anger: Conceptualization and Cycle

Developing emotional and interpersonal competence

Self assessment, analysis and action plan

Module V: Leading Through Positive Attitude

Understanding Attitudes

- Formation of Attitudes
- Types of Attitudes
- Effects of Attitude on
 - Behaviour
 - Perception
 - Motivation
 - Stress
 - Adjustment
 - Time Management
 - Effective Performance
- Building Positive Attitude

Module VI: End-of-Semester Appraisal

Viva based on personal journal

Assessment of Behavioural change as a result of training

Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Towers, Marc: Self Esteem, 1st Edition 1997, American Media
- Pedler Mike, Burgoyne John, Boydell Tom, A Manager's Guide to Self-Development: Second edition, McGraw-Hill Book Company.
- Covey, R. Stephen: Seven habits of Highly Effective People, 1992 Edition, Simon & Schuster Ltd.
- Khera Shiv: You Can Win, 1st Edition, 1999, Macmillan
- Gegax Tom, Winning in the Game of Life: 1st Edition, Harmony Books
- Chatterjee Debashish, Leading Consciously: 1998 1st Edition, Viva Books Pvt. Ltd.
- Dr. Dinkmeyer Don, Dr. Losoney Lewis, The Skills of Encouragement: St. Lucie Press.
- Singh, Dalip, 2002, Emotional Intelligence at work; First Edition, Sage Publications.
- Goleman, Daniel: Emotional Intelligence, 1995 Edition, Bantam Books
- Goleman, Daniel: Working with E.I., 1998 Edition, Bantam Books.

FRENCH - I

Code	L	T	P/FW	CREDITS
FLF111	2	-	-	2

Course Objective:

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1, 2

Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1: Découvrir la langue française: (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps

1. dire la date et l'heure

Contenu grammatical:

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation: Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
Interro-négatif: réponses: oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - I

Code	L	T	P/FW	CREDITS
FLG111	2	-	-	2

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Introduction

Self introduction: heissen, kommen, wohnen, lernen, arbeiten, trinken, etc.

All personal pronouns in relation to the verbs taught so far.

Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),

Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interview spiel

To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics

Sound system of the language with special stress on Diphthongs

Module IV: Countries, nationalities and their languages

To make the students acquainted with the most widely used country names, their nationalities and the language spoken in that country.

Module V: Articles

The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions

To acquaint the students with professions in both the genders with the help of the verb “sein”.

Module VII: Pronouns

Simple possessive pronouns, the use of my, your, etc.

The family members, family Tree with the help of the verb “to have”

Module VIII: Colours

All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb “kosten”

The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.

“Wie viel kostet das?”

Module X: Revision list of Question pronouns

W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – I

Code	L	T	P/FW	CREDITS
FLS111	2	-	-	2

Course Objective:

To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary.

Course Contents:

Module I

A brief history of Spain, Latin America, the language, the culture...and the relevance of Spanish language in today's global context.

Introduction to alphabets

Module II

Introduction to 'Saludos' (How to greet each other.How to present / introduce each other).

Goodbyes (despedidas)

The verb *llamarse* and practice of it.

Module III

Concept of Gender and Number

Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV

Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of 'Saludos' and 'Llamarse'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V

Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI

Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – I

Code	L	T	P/FW	CREDITS
FLC111	2	-	-	2

Course Objective:

There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Show pictures, dialogue and retell.

Getting to know each other.

Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called “Hanyu Pinyin” in Mandarin Chinese.)

Practicing of Tones as it is a tonal language.

Changes in 3rd tone and Neutral Tone.

Module II

Greetings

Let me Introduce

The modal particle “ne”.

Use of Please ‘qing’ – sit, have tea etc.

A brief self introduction – Ni hao ma? Zaijian!

Use of “bu” negative.

Module III

Attributives showing possession

How is your Health? Thank you

Where are you from?

A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.

Are you busy with your work?

May I know your name?

Module IV

Use of “How many” – People in your family?

Use of “zhe” and “na”.

Use of interrogative particle “shenme”, “shui”, “ma” and “nar”.

How to make interrogative sentences ending with “ma”.

Structural particle “de”.

Use of “Nin” when and where to use and with whom. Use of guixing.

Use of verb “zuo” and how to make sentences with it.

Module V

Family structure and Relations.

Use of “you” – “mei you”.

Measure words

Days and Weekdays.

Numbers.

Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation I – Interaction/Conversation Practice

Text & References:

DATA STRUCTURES USING 'C' LANGUAGE

CODE	L	T	P/FW	CREDITS
MCA201	3	1	-	4

Course Objective:

This course gives the in-depth knowledge to the use, design, and analysis of data structures in computer programs. The very commonly used data structures like arrays, stacks, queues, lists, trees, hashing and graphs will be discussed in detail. Sorting and hashing are important topics in the study of algorithms. They are also closely related to the design of data structures. Several algorithms to implement these techniques are included in the syllabus.

Course Contents:

Module I: Introduction to Data Structures

Data Types in C Language, Pointers in C, Arrays in C Language, Implementation of Single Dimensional & Multi Dimensional Arrays, Address Calculation in Single and Multi Dimensional Arrays.

Module II: Searching and Sorting Techniques

Sorting: Insertion Sort, Selection Sort, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix Sort,
Searching: Linear Search, Binary Search, Introduction Hash Functions, Hashing, Collision Resolution Techniques.
Finding Complexities of Sorting and Searching Algorithms.

Module III: Stacks

Definition & Examples, Representing Stack using an Array, Implementing Push and Pop Operation in a Stack, Infix Postfix & Prefix Expressions, Conversion from one form of an expression to another form, evaluating a Postfix Expression

Module IV: Queues

Introduction, Queues and its Sequential Representation, Insert –Delete- Print Operations, Circular Queues and their Implementation, Priority Queues with basic operations.

Module V: Programming with Linked Lists

Introduction, Insertion and deletion of a node to single linked list, Single, Doubly, Doubly Circular & Header linked lists with basic operations, List allocating and freeing dynamic variables, Addition of two polynomials list.

Module VI: Programming with Trees

Binary Trees- Operations on Binary Trees, node representation, internal and external nodes ,choosing a BST representation, threaded binary trees, finding an element in the tree, deleting kth element, tree traversal, constructing a tree, binary search tree- definition. Implementation of B.S.T. Constructing a binary search tree based on its given infix and pre/post fix order, deletion and insertion of a node in B.S.T. Height Balanced Tree. Constructing an AVL Tree, Insertion and Deletion of a node, searching a node

Module VII: Graph and Their Applications

Introduction, Graph Theory Terminology, Sequential Representation of Graph (Adjacency and Path Matrix), Warshall Algorithms, Linked Representation of Graph, Different Operations on Graphs, Traversing A Graph(DFS, BFS)., Spanning Trees-Introduction .Representation of Spanning tree, Constructing A Spanning Tree(Prim Algorithm, Krushkal Algorithm)

Examination Scheme:

Components	CT	HA/V/Q	ATTD.	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Data Structure using C, Yashwant Kanetkar, BPB Publications
- Data Structure using C, Aron M. Tannen Baum, PHI

References:

- Data Structure and Program Design, Robert L Kruse, BPB

OPERATING SYSTEM

CODE	L	T	P/FW	CREDITS
MCA202	2	1	-	3

Course Objective:

This course is aimed at providing the basic knowledge of the concepts involved in designing and working of an operating system, how it acts as a resource manager of the system as a whole, how various issues such as Memory conflicts, resource conflicts are resolved by an operating system and a study of various types of operating systems.

Course Contents:

Module I:

Introduction: What is an Operating System, Types of Operating Systems, Simple Batch Systems, Multiprogramming Systems, Time-Sharing Systems, Parallel Systems, Distributed Systems, Real-time Systems.

Operating System Structures: System Components, System Calls, System Programs, System Structure, Virtual Machines

Module II:

Processes Management: Process Concept, Process Scheduling, Operation on processes, Cooperating Processes, Interprocess Communication, Back ground process.

Module III:

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multi-Processor Scheduling, Real-Time Scheduling, Algorithm Examination System Models, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Deadlock Recovery

Module IV:

Memory Management: Memory Management, Address Space, Memory Allocation Techniques, Swapping, Paging Segmentation with paging, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement, Thrashing, Demand Segmentation

Module V:

File System Interface: File Concept, Access Methods, Directory Structure, Protection, File System Structure, and Allocation Methods.

The Unix System Case Study: History, Design Principle, Programmer Interface, User Interface, Process Management, Memory Managements, File management, Interprocess Communication.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Operating Systems Concepts, Silberschatz Galvin, Fifth Edition Addition Wesley Publication.
- Modern Operating Systems, A S Tanenbaum, Prentice Hall of India New Delhi, 1995.

References:

- Design of UNIX Operating System, Maurice J. Bauch, Prentice Hall of India.
- Operating Systems Design, Peterson & Galvin

DATA COMMUNICATION AND COMPUTER NETWORKS

CODE	L	T	P/FW	CREDITS
MCA203	3	1	-	4

Course Objective:

Upon successful completion of the course, the student will be knowledgeable of basic data communication and networking concepts. Topics include routing/switching hardware, security, distributed client/server applications and architecture, intranets and intranet servers and browsers, networks and network servers, LANs/WANs, internetworking technologies, the OSI reference model for networking protocols, CSMA/CD, TCP/IP implementation, frame relay, FDDI, X-25, ISDN services.

Course Contents:

Module I: Introduction

Computer Network, Advantages and Disadvantages of Computer Network, Communication system, Analog and digital data

Module II: Data Communication

Data Transmission: Analog Transmission, Digital Transmission, Transmission impairments

Data Encoding: Digital data-digital signals, Digital data-Analog signals, Analog data- Digital signals, analog data-analog signals, Synchronous and Asynchronous transfer

Multiplexing: Frequency division multiplexing, Time division multiplexing

Module III: Transmission Media

Twisted pair, Coaxial cable, Optical Fibers, Wireless transmission, Microwaves, Radio waves, Infrared

Module IV: Protocols and Architecture

Protocols, OSI reference Models, TCP/IP Protocol Suit

Module V: Data Link Control and Protocol

Flow Control- Stop and Wait, Sliding Window, Error Detection, Error Control, HDLC

Module VI: Network Layer

Introduction, Routers, Routing Algorithms, Congestion Control Algorithm, Addressing, Internetworking

Module VII: Transport Protocols

Transport Services, TCP, UDP

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Data Communication and Networking, Behrouz, Forouzan, TMH.
- Computer Networks', S. Tanenbaum, Eastern Economy ed., PHI.
- Data and Computer Communications, W. Stallings, Prentice Hall of India

References:

- Business Data Communications & Networking, Jerry Fitzgerald, Alan Dennis, John Wiley & Sons Inc.
- Computer Networks: Protocols, Black. U., Standards and Interfaces.

COMPUTER ORIENTED NUMERICAL ANALYSIS

CODE	L	T	P/FW	CREDITS
MCA204	3	1	-	4

Course Objective:

The course consists of theory and application of numerical approximation techniques. Topics included are numerical error, root-finding, interpolation and polynomial approximation, numerical differentiation and integration, and differential equations.

Course Contents:

Module I: Introduction

Introduction to Numerical Analysis, Application Area of N.A., Numbers and Their Accuracy, Mathematical preliminaries, Error Analysis, Absolute, Relatives, Truncation and Rounding Error.

Module II: Solution of Linear Algebraic

Introduction to Matrices, Basic Definitions, Matrix Inversion Method, Gauss Jordan Method, Eigen Values, Gauss Seidal Iterative Method

Module III: Solution of Algebraic and Transcendental Equations

Introduction, Bisection Method, Regular Falsi Method, Secant Method, Iteration Method, Newton Raphson Method, Generalized Newton Raphson Method, Rate of Convergence

Module IV: Interpolation and Curve Fitting

Basic Definition, Forward Differences, backward Differences, Central Differences, Newton Forward/Backward/Central Differences Formula, Newton's Divided Difference Formula, LaGrange's Method. Curve Fitting for line and parabola.

Module V: Numerical Difference & Integration

Numerical Differentiation based on Interpolation Formula, Numerical Integration, Trapezoidal Rules, Simpson's 1/3 rule, Simpson's 3/8 Rule, Romberg's Method.

Module VI: Numerical Solution to ODE

Basic Definition, Taylor Series Method, Euler's Method, Modified Euler's Method, Picard's Method, RungeKutta Method (2nd and 4th Order)

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- V. Raja Raman, Computer Based Numerical Methods, PHI Publication
- SS Sastry, Introductory Methods of Numerical Analysis, PHI

References:

- M.K. Jain & R.K. Jain, Numerical Solutions, New Age Publication

OPTIMIZATION TECHNIQUES

CODE	L	T	P/FW	CREDITS
MCA205	3	1	-	4

Course Objective:

Students will learn the tools and techniques of quantitative analysis outlined in the schedule, how and when to apply them, and practice application of those tools. Students completing this goal will be prepared to quantify a variety of policy problems for analysis and decision making. The syllabus includes Linear, Non-linear Programming, Transportation, Decision Theory and Project Management.

Course Contents:

Module I: Introduction of OR and Linear Programming

Basic Definition, Nature and Significance of OR, feature of OR Approach Application and Scope of OR, General Methods for Solving Or Models. General Structure of Linear Programming, Advantages and Limitations of Linear Programming, Application Areas of Linear Programming.

Linear Programming Solutions: Mathematical formulation of LPP, Standard form of LPP, Multiple Solution, Unbounded Solutions, Infeasible Solution of LPP

Module II: Simplex Method

Maximization and Minimization Problem, Solution of LPP using Graphical method, Simplex Method, two Phase Method, Big M Method

Module III: Duality in LPP

Dual Linear Programming Problem, Rules for Constructing the Dual from Primal, Feature of Duality

Module IV: Transportation Problem

Mathematical Model of Transportation Problem, Transportation Method, North West Corner Method, Linear Cost Method, Vogel's Approximation Method, Unbalanced Supply and Demand, Degeneracy Problem, Alternative Optional Solution, Maximization Transportation Problem, Trans-shipment Problem.

Module V: Decision Theory & Decision Tree

Steps in DT Approach, types of Decision Making Environments, Criterion of Optimism and Pessimism, Equally Likely Decision Criterion, Decision Making under Risk, Decision Tree Analysis.

Module VI: Theory of Games

Two Person Zero-Sum Games, Pure Strategies, Game with Saddle Point, Games without Saddle Point, Rule of Dominance, Methods for Solving Problems without Saddle Point.

Module VII: Project Management

Basic Idea of PERT & CRM, Difference between PERT & CPM, PERT/CPM Network Components and Precedence Relationship Critical Path Analysis, Project Scheduling, Project Time-Cost, Trade-Off, Resource Allocation.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Operations Research, J K Sharma, Macmillan Publication

References:

- Operations Research, H. A. Taha
- Operations Research, Kanti Swaroop, Macmillan Publication

DATA STRUCTURES USING 'C' LANGUAGE LAB

CODE	L	T	P/FW	CREDITS
MCA220	-	-	2	1

List of Experiments

1. Write a program to search an element in a given array using linear search.
2. Write a program to search an element in a given array using binary search.
3. Write a program to sort the elements of an array using the following techniques: Bubble Sort, Selection Sort, and Insertion Sort. Compare the time taken by each sorting technique.
4. Write a program using the concept of iteration and recursion to sort the elements of an array using Quick Sort.
5. Write a C program to implement Heap sort.
6. Write a program to delete an element from the kth element of an array.
7. Write a program to insert an element at the kth element in an array.
8. Write a program to remove duplicates in an array.
9. Write a program to merge two sorted arrays.
10. Write a program to perform the following operations on two given matrices: Addition and Multiplication.
11. Write a program to implement a Stack, show overflow and underflow while performing push and pop operations respectively.
12. Write a program to evaluate a postfix expression.
13. Write a program to implement a queue and show the following: insertion and deletion.
14. Write a program to implement a circular queue and show the following: insertion and deletion.
15. Write a program to implement Linear Linked List and show the following operations: creation, display, insertion, deletion and searching.
16. Write a program to increment the data part of every node in a linked list by 10.
17. Write a program to implement a stack using linked list and show the following operations: Push, Pop, and Display.
18. Write a program to implement a stack using linked list and show the following operations: Insertion, Deletion, and Display.
19. Write a program to count the number of repetitions of a number in a linked list.
20. Write a program to implement Doubly Linked List and show the following operations: creation, display, insertion, deletion and searching.
21. Write a program to implement Binary tree and display the contents using preorder, postorder and inorder traversal techniques.
22. Write a program to convert a Binary Tree to a Threaded Binary Tree.
23. Write a program to construct a Binary Search tree and perform the following operations: Insertion and Deletion of a node.
24. Write a program to construct an AVL tree and perform the following operations: insertion, deletion and searching.
25. Write a program to insert and delete nodes in a graph using adjacency matrix.
26. Write a program that demonstrates Warshall's algorithm.
27. Write a program to implement Depth First Search using linked representation of graph.
28. Write a program to implement Breadth First Search using linked representation of graph.
29. Write a program to create a minimum spanning tree using Kruskal's algorithm
30. Write a program to create a minimum spanning tree using Prim's algorithm.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MANAGEMENT INFORMATION SYSTEM

CODE	L	T	P/FW	CREDITS
MCA210	2	1	-	3

Course Objective:

This course will provide the students with an understanding of the principles of information systems technology and its impact on the strategic goals and direction of the organization. They will learn how MIS concepts are applied in business and how information systems can provide solutions to the entire organization.

Course Contents:

Module I: Introduction

Why Information System, Contemporary Approaches to Information Systems, Types of Systems in organizations, Systems from a Functional Perspective, Organization and Information Systems, Managers, Decision Making and Information Systems, Information Systems and Business Strategy Role of Internet Technology in Management, Electronic Business, Electronic Commerce.

Module II: Ethical and Social Issues

Understanding Ethical and Social Issues, Ethics in information society, Moral Dimensions of Information Systems

Module III: Information Technology Infrastructure

Computer Hardware and Information Technology Infrastructure, Categories of Computers and Computer Systems, Managing Hardware and Software Assets, Total Cost of Ownership, Rent or Build Decisions. Telecommunication and Networks Network Topologies, LANs WANs Network Services and Broadband Technologies.

Module IV: Information Systems

Types of Information Systems for Decision-Making. Decision Support Systems, Executive Information Systems, Transaction Processing Systems, Group Decision Support Systems. Redesigning the organization with Information Systems, Business Process Reengineering

Module V: Information Systems Security and Control

System Vulnerability, Creating Control Environment, Disaster Recovery Planning, Ensuring System Quality, Software Quality Assurance Methodologies and Tools. Case study on ITIL (Information Technology Infrastructure Library)

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Management Information Systems, Laudon and Laudon, Prentice Hall International

WEB TECHNOLOGIES

CODE	L	T	P/FW	CREDITS
MCA211	2	1	-	3

Course Objective:

This course is aimed to provide a fundamental understanding of web site creation. HTML is the language used for designing most basic web pages. Syllabus include basic and advanced features of HTML which includes images, links, tables, frames and forms etc. It also gives an overview of XML.

Course Contents:

Module I: Introduction to html programming

History of HTML, Structure of HTML, Adding Comments, Formatting Text, Creating List, Creating Definition List, Creating Hyper Text Links, Creating Link Lists, Inserting Inline Images, Creating Image Links, Horizontal Rules, Address Tag, Working with Text, Changing font Sizes and Colors, Using Background Image, Marquee Tag.

Module II: Tables and frames

Creating Tables, Table Element, Adding Border, Adding Column Headings, Adding Spacing and Padding, Adding a Caption, Setting the table Width and Height, Add Row Headings, Aligning Cell contents, Setting Column Width, Centering a Table, Inserting and Image, Spanning Columns, Spanning Rows Assigning Background Colors, Frame Elements, Creation of Frame Based Pages, Noframes Element.

Module III: Forms and JavaScript

Introduction to Forms, Form Elements, Front level validations using JavaScript

Module IV: Cascading style sheets

Overview of style sheets, Different ways to use style sheets, Selectors DIV and SPAN Elements, Adding style to a Document, Use id Classes and Ids, Style Sheet Properties.

Module V: XML

Introduction to XML, XML Basics, XML Structure, Developing a DTD from XML code, Viewing XML, Viewing XML using the XML Data Source Object, Viewing XML using Style Sheets.

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- HTML, DHTML, JavaScript, Perl, CGI, Ivan Bayross, BPB Publication.

References:

- HTML Complete Reference, BPB Publication.
- Internet for everyone, Alexis Leon and Mathew Leon, Leon Tech world.

Organizational Behaviour

CODE	L	T	P/FW	CREDITS
MCA212	2	1	-	3

Module – I

Organizational Behavior Today: What is Organizational Behavior, shifting paradigms of organizational behavior, organizational behavior and diversity.

Learning about Organizational Behavior: Organizational Behavior and learning imperative scientific foundations of organizational behavior.

Module – II

Challenge and Opportunities for organizational behavior: Towards improving quality & productivity, improving people skills from management control to empowerment, from statrility of flexibility, improving ethical behavior, organizational social responsibility work and quality of life.

Module - III

A Micro Perspective of Organizational Behavior: The perception process, personality and attitudes, motivation: motivating performance through job design and goal setting, learning: processes rewards systems and behavior management.

Module – IV

Micro and Macro Dynamics of Organizational Behavior: Graph dynamics and teams, interactive conflict and negotiation skills, stress: cause effects and coping strategies, leadership styles, activities and skills.

A Macro Perspective of Organizational Behavior: Communications, decision-making, Organizational Theory & Design, Organizational Culture.

Module – V

Horizons for Organizational Behavior: International Organizational Behavior(IOB), the impact of culture on IOB, Communication in IOB, motivation across culture, managerial leadership across cultures

Organizational Change & Development: Learning objectives, the changes facing organizations, managing change and organizational development, future of organizational Behavior.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

- Fred Luthans “Organizational Behavior”, McGraw Hills international Edition, Management & Organization series.
- Schermerhorn, Hunt & Osborn “Organizational Behavior” (7th Edition), John Wiley & Sours Inc.
- Stephen P. Robbins “Organizational Behavior: Concepts controversies applications”, PHI publications.
- A.J.Robertson Lvan T. and Cooper, Cary.L. “Work Psychology Understanding Human Behavior in the workplace” Macmillan India Ltd. Delhi 1996.
- M.N. Mishra “Organizational Behavior”, Vikas Pub. Co.

ADVANCED COMPUTER ARCHITECTURE

CODE	L	T	P/FW	CREDITS
MCA213	2	1	-	3

Course Objective:

The course focuses on processor design, pipelining, superscalar, out-of-order execution, caches (memory hierarchies), virtual memory, storage systems, and simulation techniques. Advanced topics include a survey of parallel architectures and future directions in computer architecture.

Course Contents:

Module I: Introduction to Computer Models

The state of computing, Multiprocessors and multicomputers, Multivector and SIMD computers, Architectural development tracks

Module II: Program and network properties

Conditions of parallelism, Data and resource dependencies, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Program flow mechanisms, Control flow versus data flow, Data flow architecture, Demand driven mechanisms, Comparisons of flow mechanisms

Module III: System Interconnect Architectures

Network properties and routing, Static interconnection networks, Dynamic interconnection Networks, Multiprocessor system interconnects Hierarchical bus systems, Crossbar switch and multiport memory, Multistage and combining network.

Module IV: Processors and Memory Hierarchy

Advanced processor technology, Instruction-set Architectures, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors

Module V: Memory Technology

Hierarchical memory technology, Inclusion, Coherence and Locality, Memory capacity planning, Virtual Memory Technology

Module VI: Backplane Bus System

Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt, Cache addressing models, direct mapping and associative caches.

Module VII: Pipelining

Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch handling techniques, Arithmetic Pipeline Design, Computer arithmetic principles, Static arithmetic pipeline, Multifunctional arithmetic pipelines

Module VIII: Vector Processing Principles

Vector instruction types, Vector-access memory schemes.

Module IX: Synchronous Parallel Processing

SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, SIMD Computers and Performance Enhancement

Module X: VLSI Computing

VLSI Computers, VLSI Complexity Model

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Advanced computer architecture, Kai Hwang, TMH.
- Computer Architecture and organization, J.P. Hayes, MGH.
- Memory System and Pipelined processors, Harvey G. Cragon, Narosa Publication.

References:

- Parallel computer, V. Rajaranam & C. S. R. Murthy, PHI.
- Foundation of Parallel Processing, R.K. Ghose, Rajan Moona & Phalguni Gupta, Narosa
- Kai Hwang and Zu, "Scalable Parallel Computers Architecture"; MGH.

EMBEDDED SYSTEMS

CODE	L	T	P/FW	CREDITS
MCA214	2	1	-	3

Module 1: INTRODUCTION

Introduction: Evolution of Computers, Technological Trends, Measuring performance Speed up, Computer organization: von Neumann Machine Architecture, Functional units and components, Program development tools. Instruction pipelining and parallel processing: Instruction pipeline, hazards, Data forwarding paths, RISC vs. CISC processors.

Module2: INTRODUCTION of EMBEDDED SYSTEM

Introduction of embeddes system, Processor: Embedded Processors in a System, Microprocessor, Microcontroller, Single Purpose Processors and Application specific system processors (ASSPs) in embedded systems. Embedded hardware units and devices

Module 3: INTERRUPTS HANDLER, EMBEDDED SOFTWARE

Interrupts handler, Embedded software, Final Machine Implement-able Software for a System, Coding of Software in Machine Codes, software in Processor Specific Assembly Language, Software in High Level Language, Program Models for Software Designing, Software for Concurrent Processing and Scheduling of Multiple Tasks and ISRs Using an RTOS, Software for the Device Drivers and Device Management using an Operating System, Software tools in designing of an Embedded System, Needed Software Tools in the Exemplary cases. Examples of Embedded System

Module 4: The Embedded Computing Platform

Embedded Computing Platform ,CPU Bus, Memory Devices, I/O Devices, Component Interfacing

Module 5: Real-Time Operating Systems

Inter Process Communication & Synchronization of Processes, task and threads, multiple processes in an application, multiple threads in an application, task and states, task and data clear cut distinction between functions, ISRs and Tasks by their Characteristics.

Module 6: CONCEPT OF SEMAPHORES

Concept of semaphores, Use of a Single Semaphore as an event signaling variable or notifying variable (event flag), Use of a Single Semaphore as resource key and in critical Section, Mutex, Use of Multiple Semaphores, Use of Mutex, Counting Semaphores, P and V semaphores shared data: Problem of Sharing Data by Multiple Tasks and Routines, Shared Data, Deadlock Situations ,inter process Communication semaphores, Message Queues, Mailboxes, Pipes, Sockets, Remote Procedure Calls (RPCs).

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

COMMUNICATION SKILLS - II

CODE	L	T	P/FW	CREDITS
BCS211	1	-	-	1

Course Objective:

To enrich the understanding of English language and communication, structure, style, usage, and vocabulary for global business purposes.

Course Contents:

Module I: Fundamentals of Communication

Role and purpose of communication: *7 C's of communication*

Barriers to effective communication

Enhancing listening

Forms of Communication: one-to-one, informal and formal

Module II: Verbal Communication (Written)

Business Letter

Social correspondence

Writing resume and Job applications

Module III: Speaking skills

Conversational English

Guidelines to give an effective presentation

Activities to include:

Presentations by students

Just a minute

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Textbook of Business Communication, Ramaswami S, Macmillan
- Speaking Personally, Porter-Ladousse, Cambridge

BEHAVIOURAL SCIENCE - II

CODE	L	T	P/FW	CREDITS
BSS211	1	-	-	1

Course Objective:

This course aims at imparting an understanding of:

- Process of Behavioural communication
- Aspects of interpersonal communication and relationship
- Management of individual differences as important dimension of IPR

Course Contents:

Module I: Behavioural Communication

Scope of Behavioural Communication

Process – Personal, Impersonal and Interpersonal Communication

Guidelines for developing Human Communication skills

Relevance of Behavioural Communication in relationship management

Module II: Managing Individual Differences in Relationships

Principles

Types of issues

Approaches

Understanding and importance of self disclosure

Guidelines for effective communication during conflicts

Module III: Communication Climate: Foundation of Interpersonal Relationships

Elements of satisfying relationships

Conforming and Disconfirming Communication

Culturally Relevant Communication

Guideline for Creating and Sustaining Healthy Climate

Module IV: Interpersonal Communication

Imperatives for Interpersonal Communication

Models – Linear, Interaction and Transaction

Patterns – Complementary, Symmetrical and Parallel

Types – Self and Other Oriented

Steps to improve Interpersonal Communication

Module V: Interpersonal Relationship Development

Relationship circle – Peer/ Colleague, Superior and Subordinate

Initiating and establishing IPR

Escalating, maintaining and terminating IPR

Direct and indirect strategies of terminating relationship

Model of ending relationship

Module VI: End-of-Semester Appraisal

Viva based on personal journal

Assessment of Behavioural change as a result of training

Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon

- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- HarvardBusinessSchool, Effective Communication: United States of America
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - II

CODE	L	T	P/FW	CREDITS
FLF211	2	-	-	2

Course Objective:

To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.

To make them learn the basic rules of French Grammar.

Course Contents:

Module A: pp.38 – 47: Unité 3: Objectif 3, 4, 5, 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical: Unité 3: Organiser son temps

2. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
3. rédiger un message/ une lettre pour ...
 - i) prendre un rendez-vous/ accepter et confirmer/ annuler
 - ii) inviter/accepter/refuser
4. Faire un programme d'activités
imaginer une conversation téléphonique/un dialogue
Propositions- interroger, répondre

Unité 4: Découvrir son environnement

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5: s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de:
 - i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut... »/ «il ne faut pas... »
5. passé composé
6. Questions directes/indirectes

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN – II

CODE	L	T	P/FW	CREDITS
FLG211	2	-	-	2

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language. To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany. Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods

Time and times of the day.

Weekdays, months, seasons.

Adverbs of time and time related prepositions

Module II: Irregular verbs

Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs

To comprehend the change in meaning that the verbs undergo when used as such

Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension

Reading and deciphering railway schedules/school time table

Usage of separable verbs in the above context

Module V: Accusative case

Accusative case with the relevant articles

Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns

Nominative and accusative in comparison

Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions

Accusative prepositions with their use

Both theoretical and figurative use

Module VIII: Dialogues

Dialogue reading: 'In the market place'

'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation, I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – II

CODE	L	T	P/FW	CREDITS
FLS211	2	-	-	2

Course Objective:

To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I

Revision of earlier modules.

Module II

Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III

More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs (*bueno/malo, muy, mucho, bastante, poco*).

Simple texts based on grammar and vocabulary done in earlier modules.

Module IV

Possessive pronouns

Module V

Writing/speaking essays like my friend, my house, my school/institution, myself...descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – II

CODE	L	T	P/FW	CREDITS
FLC211	2	-	-	2

Course Objective:

Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, “ma” with a third tone, it mean horse and “ma” with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II

Where do you live?
Learning different colors.
Tones of “bu”
Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time.Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end etc.
Morning, Afternoon, Evening, Night.

Module III

Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf,..etc.
Description of room, house or hostel room..eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression ‘yao’, ‘xiang’ and ‘yaoshi’ (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV

Counting from 1-1000
Use of “chang-chang”.
Making an Inquiry – What time is it now? Where is the Post Office?
Days of the week.Months in a year.
Use of Preposition – “zai”, “gen”.
Use of interrogative pronoun – “duoshao” and “ji”.
“Whose”??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V

The verb “qu”
- Going to the library issuing a book from the library
- Going to the cinema hall, buying tickets
- Going to the post office, buying stamps
- Going to the market to buy things.. etc
- Going to the buy clothes Etc.

Hobby. I also like swimming.
Comprehension and answer questions based on it.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I” Lesson 11-20

COMPUTER GRAPHICS

Code	L	T	P/FW	CREDITS
MCA301	2	1	-	3

Course Objective:

The course provides the necessary theoretical background for introductory computer graphics and demonstrates the application of computer science to graphics. It also offers an opportunity for students to formulate and implement applications of computer graphics. This course further allows students to develop programming skills in computer graphics by programming assignments.

Course Contents:

Module I

Overview of Graphics System :Video Display Devices, Raster Scan Display, Random Scan Display, Input Devices, Graphic Software

Output Primitives :Points and Lines, Line-Drawing Algorithm, Circle Generation Algorithms, Ellipse Generation Algorithm, Conic Section, Polynomial and Spline Curves, Pixel Addressing, Filled Area Primitives, Fill Area Functions.

Module II

Two Dimensional Geometric Transformation :Basic Transformations, Motion Representation, Composite Transformation, Translation, Rotation, Scaling, General Pivot-Point Rotation, General Fixed Point Scaling, General Scaling Directions, Reflection, Shear, Transformation between Co-ordinate System, Affine Transformations, Raster Methods for Transformations

Two-Dimensional Viewing :The Viewing Pipeline, Viewing Co-ordinate Reference Frame, Window to New Port Co-ordinate Transformation, Two Dimensional Viewing Functions, Clipping Operations, Line Clipping, Polygon Clipping.

Module III

Three Dimensional Concepts :Three Dimensional Display Methods.Parallel Projection,Perspective Projection, Depth Cueing, Visible Line and Surface Identification, Surface Rendering

Three Dimensional Geometric and Modeling Transformations :Translation, Rotation, Scaling, Other Transformations, Composite Transformer.

Three Dimensional Viewing :Viewing Pipeline, Viewing Co-ordinate, Projections, Clipping

Module IV

Visual- Surface Detection Methods :Classification of Visiting Surface Detection Algorithm, Back Face Detection, Depth-Buffer Method, A Buffer Method, Scan-Line Method

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Computer Graphics, Donald Hearn, M Pauline Baker, 2nd Edition, PHI 1999
- Schaum Series, Computer Graphics

References:

- Computer Graphics, N. Krishnamurthy, TMH

OBJECT ORIENTED PROGRAMMING WITH C++

Code	L	T	P/FW	CREDITS
MCA302	2	1	-	3

Course Objective:

This course is aimed at developing Programming skills using Object Oriented Technology in C++. This purpose of this subject is to improve the programming approach and development of software using OOPS technology. The Subject involves various concepts of Object Oriented Programming such as Classes, Objects, Polymorphism, Inheritance, Templates, Exception Handling etc. needed for a better approach towards software development.

Course Contents:

Module I: Basic Concepts of OOPS

Introduction of C++, Features of OOPS, Distinction between procedural and oops programming, definitions of class and objects, Concepts of inheritance, encapsulation, Abstraction, and Polymorphism. Dynamic Binding, Message Passing. Characteristics of Object-Oriented Languages.

Module II: Overview of OOP Using C++

Basic Program Construction: Main And Functions, Program Statements, Class Declaration, Comments, Starting, Compiling and Executing C++ Programs, Elements of C++ Language, Variables & Constants, Data Types Operators, Control Statements, Loops, Arrays

Module III: Functions

Simple Functions, Passing Arguments & Returning Values, Reference variables and arguments, Function Overloading, Inline Functions, Programming Style, Access Specifiers.

Module IV: Classes and Objects

Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, Structures and Classes, Scope resolution operator, Friend Functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects.

Module V: Inheritance

Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Overriding inheritance methods, Constructors in derived class. Nesting of Classes

Module VI: Polymorphism

Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading. Overloading unary operator, Overloading binary operator, Pitfalls of Operator Overloading, Data Conversion from one data type to another. Pointers and Arrays, Pointers and Functions, Pointer to objects, this pointer, Virtual Functions, pure virtual functions. Memory management Operators.

Module VII: Files and Streams

Files and Streams: streams, string I/O, character I/O, object I/O, file pointer, error handling, command line arguments. formatted and Unformatted Input output

Module VIII: Template and Exception handling

Generic Programming – function template, class Template Standard Template Library: Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes. Overview of Exception handling.

Examination Scheme:

Components	CT1	PR.	ATTD.	EE
Weightage (%)	10	15	5	70

Text & References:

Text:

- Object Oriented Programming in Turbo C++ , E. Balaguruswamy, Tata McGrahill

References:

- Object Oriented Programming with C++, Robert Lafore, Galgotia Publication
- C++ Programming, Yashavant Karnitkar, BPB Publications
- Mastering C++, K R Venugopal, Raj Kumar, T Ravishankar, Tata McGraw-Hill 2005

CORE JAVA

Code	L	T	P/FW	CREDITS
MCA303	2	1	-	3

Course Objective:

This course will introduce the essential topics of Internet Programming predominately with the Java programming language. Students will design and write interactive WWW pages using Java, HTML, CGI, VRML programming languages. Students will develop software that manipulates different forms of data such as hypertext, graphics, video, and sound. Advanced interactive/executable web pages will be developed.

Course Contents:

Module I: Introduction

Basics of computer communication, OSI Model of ISO, LAN, WAN, Internet, Evolution of Internet, Internet Applications, TCP/IP, Introduction to RFC, Addressing in Internet – IP and Domains, Internet Service Providers, Types of connectivity such as dial-up, leased, VSAT etc., Internet Server and Client modules on various Operating Systems

Module II: Introduction to World Wide Web

Evolution of World Wide Web, Basic features, WWW browsers, WWW servers, HTTP & URL's

Module III: WWW Browsers

Basic features, Netscape Communicator, Internet Explorer, Internet Explorer

Module IV: HTML

Document Overview, Header Element, Lists Hypertext Links, Visual Markup, URLs
Images, Forms, Tables, Special Characters

Module V: Introduction to JAVA Programming

Introduction to Java, Java features, An Overview of Java, Data Types, Variables, Arrays, Operators, and Control Statements.

Module VI: Java with Object Orientated Features

Introducing Classes, A Closer look at Methods and Classes, Inheritance, Packages and Interfaces, Exception Handling, Multithreaded Programming, I/O, and Applets.

Module VII: The Java Library

String Handling, Exploring java lang, Input/Output: Exploring java. io, Networking, and Event Handling.

Module VIII: GUI in Java

Introducing the AWT: Working with Windows, Layout Managers, and Images.

Examination Scheme:

Components	CT	HA/V/Q	Att'd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Patrick Naughtn and Herbert Schildt The Complete Reference, Java 2, TMH
- Douglas E.Cmer, Computer Networks & Internet, Pearson.

References:

- The Internet :By- Douglas E.Cmer: TMH

SUMMER PROJECT- I

Code	L	T	P/FW	CREDITS
MCA360	-	-	-	6

Guidelines:

There are certain phases of every Intern's professional development that cannot be effectively taught in the academic environment. These facets can only be learned through direct, on-the-job experience working with successful professionals and experts in the field. The internship program can best be described as an attempt to institutionalize efforts to bridge the gap between the professional world and the academic institutions. Entire effort in internship is in terms of extending the program of education and evaluation beyond the classroom of a university or institution. The educational process in the internship course seeks out and focuses attention on many latent attributes, which do not surface in the normal classroom situations. These attributes are intellectual ability, professional judgment and decision-making ability, inter-disciplinary approach, skills for data handling, ability in written and oral presentation, sense of responsibility etc.

In order to achieve these objectives, each student will maintain a file (**Internship File**). The Internship File aims to encourage students to keep a personal record of their learning and achievement throughout the Programme. It can be used as the basis for lifelong learning and for job applications. Items can be drawn from activities completed in the course modules and from the workplace to demonstrate learning and personal development.

The File will assess the student's analytical skills and ability to present supportive evidence, whilst demonstrating understanding of their organization, its needs and their own personal contribution to the organization.

The **layout guidelines** for the Project & Seminar Report

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page

Table of Content

Acknowledgement

Student Certificate

Company Profile (optional)

Introduction

Main Body

References / Bibliography

The File will include **five sections** in the order described below. The content and comprehensiveness of the main body and appendices of the report should include the following:

1. **The Title Page**--Title - An Internship Experience Report For (Your Name), name of internship organization, name of the Supervisor/Guide and his/her designation, date started and completed, and number of credits for which the report is submitted.
2. **Table of Content**--an outline of the contents by topics and subtopics with the page number and location of each section.
3. **Introduction**--short, but should include how and why you obtained the internship experience position and the relationship it has to your professional and career goals.
4. **Main Body**--should include but not be limited to daily tasks performed. Major projects contributed to, dates, hours on task, observations and feelings, meetings attended and their purposes, listing of tools and materials and their suppliers, and photographs if possible of projects, buildings and co-workers.
5. **References / Bibliography** --This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system

ASSESSMENT OF THE INTERNSHIP FILE

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Internship File. Each item in the SAR is ticked off when it is completed successfully. The faculty will also assess each item as it is completed. The SAR will be signed by the student and by the faculty to indicate that the File is the student's own work. It will also ensure regularity and meeting the delaines.

STUDENT ASSESSMENT RECORD (SAR)

1. Range of Research Methods used to obtain information

2. Execution of Research

3. Data Analysis

- Analyse Quantitative/ Qualitative information
- Control Quality

4. Draw Conclusions

Examination Scheme:

Components	V	S	R	FP
Weightage (%)	20	20	20	40

V – Viva, S – Synopsis, FP – Final Presentation, R - Report

COMPUTER GRAPHICS LAB

Code	L	T	P/FW	CREDITS
MCA320	-	-	2	1

Course Contents:

List of Computer Graphics Programmes

- 1) Write a program to change the working mode from text to graphics and plot a pixel.
- 2) Write a program to draw a line of same dimension in three different graphics mode.
- 3) Write a program to display line, rectangle, circle and polyline using graphics command.
- 4) Write a program to draw a line of slope between 0 and 1 using DDA algorithm.
- 5) Write a program to draw a line of slope between 1 and ∞ using DDA algorithm.
- 6) Write a program to draw a line of slope between 0 and 1 using midpoint algorithm.
- 7) Write a program to draw a line of slope between 1 and ∞ using midpoint algorithm.
- 8) Write a program to draw a dashed line of slope 1 using any line algorithm.
- 9) Write a program to draw a dotted line of slope 1 using DDA algorithm.
- 10) Write a program to draw a line of slope between 0 and -1 using midpoint algorithm.
- 11) Write a program to draw a line of slope between -1 and $-\infty$ using midpoint algorithm.
- 12) Write a program to draw an octant of a circle with its center at point (0,0) using midpoint circle drawing.
- 13) Write a program to draw a circle with its center at point (0, 0) and radius r using midpoint circle drawing.
- 14) Write a program to draw an octant of a circle with its center at point (a, b) and radius r using midpoint circle drawing.
- 15) Write a program to draw a circle with its center at point (a, b) and radius r using midpoint circle drawing.
- 16) Write a program to fill a polygon using flood-fill method.
- 17) Write a program to fill a polygon using boundary-fill method.
- 18) Write a program to reflect a point in X and Y-axis both.
- 19) Write a program to rotate a point (100, 50) about origin in anti-clock wise direction.
- 20) Write a program to rotate a point (100,150) about point (30, 40) in clock wise direction..

OBJECT ORIENTED PROGRAMMING WITH C++ LAB

Code	L	T	P/FW	CREDITS
MCA321	-	-	2	1

1. Write a program to display diamond of stars (*'s).
2. WAP to print Fibonacci series of 'n' numbers, where n is given by the programmer.
3. WAP to read a set of numbers in an array & to find the largest of them.
4. WAP to sort a list of names in ascending order.
5. WAP to sort an array of integers using functions.
6. WAP to exchange contents of two variables using call by value.
7. WAP to exchange contents of two variables using call by reference.
8. WAP to do the following using inline functions:
 - a. Generate the following menu:
 1. Add two numbers.
 2. Subtract two numbers.
 3. Multiply two numbers.
 4. Divide two numbers.
 5. Exit.
 - b. Ask the user to input two integers and then input a choice from the menu. Perform all the arithmetic operations which have been offered by the menu. Checks for errors caused due to inappropriate entry by user and output a statement accordingly.
9. WAP to add two complex numbers using friend function.
10. Write a program to exchange values between two classes using friend function.
11. Calculate area of different geometrical figures (circle, rectangle, square, triangle) using function overloading.
12. Write a program to overload a function and create a situation such that the compiler does internal conversion.
13. Create a class Complex for performing all arithmetic operations with complex numbers.
14. WAP to maintain the student record which contains Roll number, Name, Marks1, Marks2, Marks3 as data member and getdata(), display() and setdata() as member functions.
15. Write a class bank, containing data member: Name of Depositor, A/c type, Type of A/c, Balance amount. Member function: To assign initial value, To deposit an amount, to withdraw an amount after checking the balance (which should be greater than Rs. 500), To display name & balance.
16. Write a program to add & multiply two matrices by overloading + and * operators respectively.
17. Design three classes: Student, Test & Result. The Student class has its data members such as roll no, name etc. Create a Test class by inheriting the Student class. The Test class adds its own data members representing the marks scored in four subjects. Design one more class named as Sports which has a single data member representing sports marks. Derive the Result from class Test & Sports. What type of relationship this model belongs to? Write a program to model this relationship.
18. Write a class string to compare two strings, overload (= =) operator.
19. Declare a class of vehicle. Derived classes are two-wheeler, three-wheeler & four-wheeler. Display the properties of each type of vehicle using member functions of classes.
20. Create two classes namely Employee and Qualification. Using multiple inheritance derive two classes Scientist and Manager. Take suitable attributes & operations. WAP to implement this class hierarchy.
21. Consider an example of book shop which sells books and video tapes. These two classes are inherited from base class called media. The media class has command data members such as title and publication. The Book class has data members for storing number of pages in a book and tape class has playing time in a tape. Each class will have member functions such as read() and show(). In the base class, these members have to be defined as virtual functions. Write a program to model the class hierarchy for book shop and process objects of these classes using pointers to base class.
22. Write a program to create template to perform bubble sort for an array of any data type.
23. WAP to read data from keyboard & write it to the file. After writing is completed, the file is closed. The program again opens the same file and reads it.
24. WAP to reverse a string using pointers and arrays.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

CORE JAVA LAB

Code	L	T	P/FW	CREDITS
MCA322	-	-	2	1

1. Write a Java Program to compute & print factorial of any given number.
2. Write a Java Program to compute the sum of digits of a given integer.
3. Write a Java Program to calculate & print first n Fibonacci numbers.
4. Write a Java Program to reverse the digits of a numbers.
5. Assume that a bank maintains two kinds of account for its customers, one called saving and other current. The saving account provides compound interest and withdrawal facilities but not cheque book. The current account provides cheque book but no interest. Current account holders should also maintain a min balance & if the balance falls below, a service charge is imposed. Create a class Account that stores customer name, account number & type of account. From this derive the classes Curr-acc & Sav-acc to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:
 - a) Accept deposit from a customer and update the balance
 - b) Display the balance.
 - c) Compute and deposit interest
 - d) Permit withdrawal and update the balance.
 - e) Check for the minimum balance, impose penalty. If necessary, and update the balance
6. Write a Java Program to sort element of the array.
7. Write a Java Program to read marks out of 100 declare result as follows:
 - a. 60 or more 1st class
 - b. 50-59 2nd class
 - c. 40-49 pass
 - d. Less than 40 fail
8. Write a java program to check whether a year is a leap year or not.
9. Write a Java Program to read string from console and display the number of occurrence of each word
10. Write a Java Program to demonstrate use of Inheritance through vehicle, two wheeler, four wheeler and three-wheeler class.
11. Write a Java Program to demonstrate runtime polymorphism with the help of abstract classes.
12. Write a Java Program to demonstrate runtime polymorphism with the help of interfaces.
13. Write a java program to display the use of all access modifiers with the help of two packages
14. Write a Java Program to take a filename as command line argument and display its contents.
15. Write a Java Program that reads a file and then displays it, with a line number before each line.
16. Write a Java Program that displays number of characters, lines and words in a text file.
17. Write a Java Program that appends the contents of one file to another.
18. Write a Java Program to demonstrate how we can make sure that the main thread gets executed after the child threads finishes.
19. Write a Java Program to show exception handling. Also demonstrate the use of finally.
20. Write a Java program which takes as input a number and throws a user defined exception when number is greater than 10.
21. Write a Java Program to demonstrate the use of throws. Also show what happens if a parent exception class precedes a child exception class in the throws class.
22. Write a Java Program to demonstrate the Applet Life Cycle.
23. Develop an applet that displays the received integer in one text box and then on pressing the compute button, displays the factorial in another text box.
24. Write a Java Program to demonstrate a working chat applet (Create both server and client).
25. Write a Java Program to roll a given string diagonally in an Applet. Make use of <param> tag for setting the width and height of the applet.
26. Write a Java Program a program to show how interface can be used to support multiple inheritances in java.
27. Create an applet that will have a text area and a Frame. When any mouse event occurs on the frame, make an entry of that event into the text area. For example, add "Mouse Dragged" when the mouse id dragged.
28. Write a Java program in which Server and client communicate using UDP sockets.
29. Write a Java program in which Server and client communicate using TCP/IP sockets.
30. Create an applet with Border Layout, with a button in each of the border layout component.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Fundamentals of E-Commerce

Code	L	T	P/FW	CREDITS
MCA310	2	1	-	3

Course Objective:

To make a student familiar with the mechanism of conducting business transactions through electronic media. To understand the scenario in India.

Module 1: Introduction to E-Commerce

Introduction to e-commerce, e-commerce opportunities, e-com framework, recent developments, new trends, Introduction to e-business, What is the difference between e-commerce and e-business?, How significant are e-commerce and e-business?, Business adoption of digital technologies for e-commerce and e-business, Introduction to B2B, B2C and C2C models and companies

Module 2: Internet Protocols

Development & growth, DNS, commercialization of internet, planning for network infrastructure and web architecture, introduction to internet protocols- layers and networking, Internet Protocol suite, Desktop TCP/IP, Mobile TCP/IP based networking, Multicast IP, Focus on web service and service-oriented, Focus on new access devices

Module 3: Website Hosting

Principles of website hosting and promotion, decision on website design, legal issues, Domain Name Registration, website hosting, website registration, online and offline promotion

Module 4: E-Commerce Business Models

Difference between e-commerce and e-business, business models: brokerage model, advertising model, infomediary model, merchant model, manufacturer model, affiliate model, community model, subscription model, utility model, tried & true models

Module 5: Electronic Payment

Auctions as a price setting mechanism, pricing information, versioning information, cyber laws, digital cash, e-wallet, concept of https, IVR transactions, payment through net banking, digital signature

Module 6: E-business strategy & M-Commerce

Introduction, Strategic analysis, Strategic objectives, Strategy definition, Strategy implementation, Focus on information systems strategy and e-business strategy, e-procurement, e-governance, e-marketing, change management

Introduction to m-commerce: Emerging applications, different players in m-commerce, m-commerce life cycle Mobile financial services, mobile entertainment services, and proactive service management, Management of mobile commerce services: Content development and distribution to hand-held devices, content caching, pricing of mobile commerce services, the emerging issues in mobile commerce: The role of emerging wireless LANs and 3G/4G wireless networks, personalized content management, implementation challenges in m-commerce, futuristic m-commerce services

Examination Scheme:

Components	CT	HA/V/Q	ATTD.	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

References:

- E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
- E-Commerce, S.Jaiswal – Galgotia.
- E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang

ACCOUNTING & FINANCIAL MANAGEMENT

Code	L	T	P/FW	CREDITS
MCA311	2	1	-	3

Course Objective:

This course is designed to provide a basic understanding of financial accounting, including introductory accounting theory, concepts, principles and procedures. Specific attention will be devoted to the preparation and understanding of the financial statements.

Course Contents:

Module I: Accounting

Principles, concepts and conventions, double entry system of accounting, introduction to basic books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading, Profit and Loss accounts and Balance Sheet of sole proprietary concern (Without adjustments).

Module II: Financial Management

Meaning, scope and role, A brief study of functional areas of financial management. Introduction to Various FM Tools: Ratio Analysis, Fund flow statement & Cash flow statement. Introduction to Cost Accounting Nature, Importance & Basic Principles. Brief Introduction to methods of Costing & Elements of Cost, Unit Costing.

Module III: Computerized Accounting

Meaning & advantages, limitations of computerised accounting, manual accounting verses computerised accounting, Source documents, Balancing Accounts, Trial Balance & Final A/Cs in Computerised. Accounting. Modules of Computerised Accounting Systems. Developing computerised accounting systems, control & Audit in computerised accounting.

Module IV: Financial Systems

Business Systems, Production Control System, Inventory System, Payroll System

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Financial Accounting, P. C. Tulsian
- Principles A Book - Keeping, J.C. Katyal
- Financial Management, I.M. Pandey, Vikas Publications,
- Computerized Accounting, P.H. Bassett, BPB.

References:

- Financial Management, P.V. Kulkarni, Himalaya Publishing House.
- Management Accounting, Sharma, Gupta & Bhalla
- Business Computer Systems: Design, Programming & Maintenance, Charlotte Eudy McConn, PHI

PARALLEL PROCESSING

Code	L	T	P/FW	CREDITS
MCA312	2	1	-	3

Course Objective:

This is an introductory course in parallel computing. We will examine parallel architectures, parallel programming, and parallel algorithms and distributed programming. The course is software oriented with applications in high performance computing and scientific computing.

Course Contents:

Module I: Basic Concepts

Introduction to parallel processing, parallel processing terminology, decomposition, complexity, throughout, speedup, measures, data dependence, resource dependence, Bernstein's conditions levels of parallelism in programs. Program flow-control flow, data flow, Distributed systems – Introduction, advantages, tightly-coupled loosely-coupled systems. Hardware and software requirements, design issues.

Module II: Parallel Processing – Structure & Organization

Taxonomy of parallel processes: granularity, basic architectures, multiprocessors, vector processors, pipeline, array, systolic, wave front array, cube architecture, hypercube, CCC, pyramid, prism, network architecture – binary tree, hypertree butterfly, shuffle exchange, dataflow architecture, connection machine.

Distributed Systems: Review of networks, layered protocols – Physical, data link network, transport, application, Network operating system, Distributed Operating System, Resource sharing, Message passing, example system, Synchronization aspects, clocks, algorithms, Mutual exclusion, coroutines, CSP, DP, Deadlocks, Distributed deadlock detection, Modelling – Petri Nets.

Module III: Parallel Algorithms

PRAM model of computation, Elementary parallel algorithms – Broadcast, prefix sums, permutation, parallel selection, merging, sorting, Odd-even, bitonic merge, dictionary operations, elliss, Algorithm Graph Algorithms, Matrix-transportation, multiplication, solving linear systems.

Module IV: Parallel & Distributed Programming

Parallel Programming environments, models, synchronous asynchronous programming, modulla-2, occamm, FORTRAN, DAP FORTRAN, Actus, data flow programming, VAL.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Michael J. Quinn, "Parallel Computing – Theory and Practice, 2nd Edition, McGraw Hill, 1994
- Kai Hwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability", McGraw Hill Inc, 1993
- S. G. Akl, "The Design and Analysis of parallel algorithms", Englewood Cliffs, NJ, 1989

References:

- A. S. Tanenbaum, "Modern Operating System", PHI, 1996.
- R. H. Perrott, "Parallel Programming", Addison Wesley, 1987.
- T. G. Lewie and H. Ele-Revini, "Introduction to Parallel computing", PHI, NJ, 1992.

ADVANCED DATABASE CONCEPTS

Code	L	T	P/FW	CREDITS
MCA313	2	1	-	3

Course Objective:

The purpose of this course is to provide students with a strong foundation in advanced database concepts from an industry perspective. The course covers advanced data modeling concepts like query processing, transaction and concurrency control techniques. Students also learn object-oriented and object-relational database, distributed database concepts as well as the growing relationship between databases and the World Wide Web.

Course Contents:

Module I: Query Processing

Basic concepts of query processing, converting SQL queries into Relational Algebra, Basic Algorithms for executing query operations, Query tree and query graph, Heuristic optimization of query tree.

Module II: Transaction & Concurrency Control

Basic definitions, ACID properties, schedules, Serializability of schedules, deadlocks, and concurrency control techniques, locking techniques, time-stamp based techniques, Multi-version techniques, validation techniques.

Module III: Object Oriented and Extended Relational Database Technologies

Overview of Object oriented database, OO Concepts, Encapsulation of Operations and methods, Inheritance, Object Model, Object definition language, object Query Language, Object Relational Concepts.

Module IV: Distributed Database

Introduction, Distributed databases principles, architectures, design, implementation. Fragmentation, Transparencies in Distributed Databases, Transaction control in Distributed Database, Query Processing in Distributed Database

Module V: Emerging Database Trends

Object oriented databases, Data warehousing and Data Mining, Active database, Spatial Database, Deductive database, Temporal database, Multimedia database, Distributed Database.

Examination Scheme:

Components	CT1	PR.	ATTD.	EE
Weightage (%)	10	15	5	70

Text & References:

Text:

- Fundamental of Database Systems, Elmasri & Navathe, Pearson Education, Asia
- Database System Concepts, Korth & Sudarshan, TMH

References:

- Data Base Management System, Leon & Leon, Vikas Publications
- Introduction to Database Systems, Bipin C Desai, Galgotia

MOBILE COMPUTING

Code	L	T	P/FW	CREDITS
MCA314	2	1	-	3

Course Objective:

The objective of the course is to introduce the students with the various upcoming technologies in the area of mobile computing including GSM, GPRS and WAP etc.

Course Contents:

Module I: Introduction to Personal Communications Services (PCS)

PCS Architecture, Mobility management, Networks signaling.

Module II: Global System for Mobile Communication (GSM) system overview

GSM Architecture, Mobility management, Network signaling.

Module III: General Packet Radio Services (GPRS)

GPRS Architecture, GPRS Network Nodes.

Module IV: Mobile Data Communication

WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.

Module V: Wireless Application Protocol (WAP)

The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML).

Module VI: Third Generation (3G) Mobile Services

Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.

Module VII: Wireless Local Loop (WLL)

Introduction to WLL Architecture, wireless Local Loop Technologies.

Module VIII: Global Mobile Satellite Systems

Case studies of the IRIDIUM and GLOBALSTAR systems.

Module IX: Wireless Enterprise Networks

Introduction to Virtual Networks, Blue tooth technology, Blue-tooth Protocols.

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	10	15	5	70

Text & References:

Text:

- Wireless and Mobile Networks Architectures, by Yi-Bing Lin & Imrich Chlamtac, John Wiley & Sons, 2001.
- Mobile and Personal Communication systems and services, by Raj Pandya, Prentice Hall of India, 2001.

References:

- Guide to Designing and Implementing wireless LANs, by Mark Ciampa, Thomson learning, Vikas Publishing House, 2001.
- Wireless Web Development, Ray Rischpater, Springer Publishing, 2000.
- The Wireless Application Protocol, by Sandeep Singhal, Pearson Education Asia, 2000.
- Third Generation Mobile Telecommunication systems, by P. Stavronlakis, Springer Publishers, 2001.

THEORY OF COMPUTATION

Code	L	T	P/FW	CREDITS
MCA315	2	1	-	3

Module I: Automata

Introduction to formal proof – Additional forms of proof – Inductive proofs – Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

Module II: Regular expressions and languages

Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.

Module III: Context-free grammars and languages

Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG – Deterministic Pushdown Automata.

Module IV: Properties of context-free languages

Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM.

Module V: Undecidability

A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem – The classes P and NP.

Text Book:

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education, 2007.

References:

1. H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education, 2003.

2. Thomas A. Sudkamp, "An Introduction to the Theory of Computer Science, Languages and Machines", Third Edition, Pearson Education, 2007.

3. Raymond Greenlaw and H. James Hoover, "Fundamentals of Theory of Computation, Principles and Practice", Morgan Kaufmann Publishers, 1998.

4. Michael Sipser, "Introduction of the Theory and Computation", Thomson Brooks/Cole, 1997.

5. J. Martin, "Introduction to Languages and the Theory of computation", Third Edition, Tata Mc Graw Hill, 2007

C# (C Sharp) with GUI

Code	L	T	P/FW	CREDITS
MCA330	2	1	-	3

Course Objective:

- To understand .NET technology and .NET framework
- To gain ability to work in Visual Studio 2008 Team System IDE
- To recap Object Oriented Concept and its use in C#
- To gain ability to work with windows programming and event handling
- Usage of built-in testing and code analysis tools in Visual Studio 2008 Team System in .NET framework

Course Contents:

Module I

Introduction to OOPs: Introduction to OOPs, Features of OOPs: Encapsulation, Abstraction, Inheritance, Polymorphism, Concept of Classes and Objects, Introduction to compilers, Introduction to .Net framework, Introduction to Visual Studio IDE

Introduction to C#: Define classes in C#, Introduction to Namespaces, Defining Access Specifiers, Declare variables, Data-types in C#, Writing, compiling & executing programs in C#, Use various operators: Arithmetic operators, Arithmetic assignment operators, Unary operators, Comparison operators, Logical operators, Use conditional constructs, Use looping constructs, Working with arrays and multi-dimensional arrays

Working with Methods : Use methods, using methods with parameters, using static variables and static functions, main method: its parameters and using options, constructors: types of constructors (instance & static), using default and parameterized constructors, static block, using destructors

Module II

Working with Classes and Objects : Describe memory allocation, Use structures, Use enumerations, Use collections, life cycle of an object, Relationship between classes: Inheritance relationship, Composition relationship, Utilization relationship, Instantiation relationship, Implement Encapsulation by using Access Specifiers. Using abstract classes, using abstract methods, using sealed classes, using interfaces, implementing polymorphism: function overloading & overriding, constructor overloading, operator overloading

Module III

File Handling: Implementing the file input and output operations, File Stream class, implementing read & write operations in text and binary files, Implement the Windows File System: DirectoryInfo class, FileInfo class

Exception Handling : Describing exceptions, types of errors, exception classes, Exception Super class, handling exceptions, implementing the user-defined exceptions, use of throw & throws keywords

Module IV

Working with Threads: Concept of threading, implementing threads, defining the life cycle of a thread, understanding and implementing multi-threading, identifying and modifying thread priority, using synchronization between threads, working with delegates

Module V

GUI : Introduction to GUI, identify the controls of GUI, use of Visual Studio GUI for developing windows applications, Working with form controls, validate user inputs using controls and events, working with CommonDialog class, working with menus, working with MDI applications, using ToolStrip control, using crystal reports

Examination Scheme:

Components	CT	HA/V/Q	Att'd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Troelsen, Andrew, "C# and the .NET Platform", Apress
- Archer, Tom, "Inside C#", Wrox Publication
- Sharp, John, "Microsoft Visual C# 2005 Step by Step", Microsoft, 2005

References:

- Microsoft.com .NET site (<http://www.microsoft.com/net>)
- .NET Framework 3.0 (formerly WinFX) <http://www.netfx3.com>
- Virtual labs at <http://msdn.microsoft.com/virtuallabs/netframe/default.aspx>
- Learn .NET 3.5 at <http://msdn2.microsoft.com/en-us/netframework/default.aspx>
- MSDN® Online .NET Information (<http://msdn.microsoft.com/net>): A rich source of information for developers worldwide who want to use .NET technologies and tool
- Visual Studio.NET home page (<http://msdn2.microsoft.com/en-us/vstudio/default.aspx>) Product information for the rapid application development environment Visual Studio.NET.
- www.msdn.com
- <http://www.c-sharpcorner.com/>

PHOTOSHOP

Code	L	T	P/FW	CREDITS
MCA331	2	1	-	3

Course Objective:

The course provides the introduction to using Adobe Photoshop for the purposes of working with digital images, restoring photographs, creating professional advertisements, Graphic design techniques.

Course Contents:

Module I

Basics of Adobe Photoshop :About Photoshop, Navigating Photoshop, Menus and panels, Opening new files, Opening existing files, Exploring the Toolbox, Applications Bar & the Options Bar, Creating & Viewing a New Document, Customizing the Interface, Setting Preferences, using the tools, basic workflow, creating effective storing, batch renaming, how to save your photos, digital asset management, File types, File sizes, Color types

Layers :Layer styles, opacity, adjustment layers, Understanding the Background Layer, Creating, Selecting, Linking & Deleting Layers, Locking & Merging Layers, Copying Layers, Using Perspective & Layer Styles, Filling & Grouping Layers, Introduction to Blending Modes, Blending Modes, Opacity & Fill, Creating & Modifying Text

Module II

Retouching :Color manipulations, Levels, Curves, Seeing Color accurately, Patch tool, Cropping, Reading your palettes, Dust and scratches, smoothing skin, smoothing wrinkles, special color effects: black and white, sepia, grainy, Color Spaces & Color Modes, The Variations Command, The Auto Commands, Adjusting Levels, Adjust Curves, Non-Destructively with Adjustment Layers

Module III

Working with images :Zooming & Panning an Image, Working with Multiple Images, Rulers, Guides & Grids, Undoing Steps with History, Adjusting Color with the New Adjustments Panel, The New Masks Panel & Vibrance Color Correction Command, The New Note Tool & the Save for Web & Devices Interface, The New Auto-Blend & Auto-Align Layers Commands, The New 3D Commands, Understanding Pixels & Resolution, The Image Size Command, Interpolation Options, Resizing for Print & Web, Cropping & Straightening an Image, Adjusting Canvas Size & Canvas Rotation, Printing basics, emailing basics, making cards, making collages, cataloging your images

Module IV

Working with pictures :The Red Eye Tool, The Clone Stamp Tool, The Patch Tool & the Healing Brush Tool, The Spot Healing Brush Tool, The Color Replacement Tool, The Toning & Focus Tools, Painting with History, editing your photoshoot, naming your shoot, automating your shoot, batch processing, introduction to actions

Module V

Working with tools and Special Effects:Selecting with the Elliptical Marquee Tool, Using the Magic Wand & Free Transform Tool, Selecting with the Regular & Polygonal Lasso Tools, Combining Selections, Using the Magnetic Lasso Tool, Using the Quick Selection Tool & Refine Edge, Modifying Selections, Using the Brush Tool, Working with Colors & Swatches, Creating & Using Gradients, Creating & Working with Brushes, Using the Pencil & Eraser Tools, Painting with Selections, Quick Mask Options, Painting a Selection, Saving & Removing a Selection from the Background, Understanding Paths & the Pen Tool, Creating Straight & Curved Paths, Creating Combo Paths, Creating a Clipping Path, Getting Started with Photoshop Filters, Smart Filters, Creating Text Effects, Applying Gradients to Text

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Adobe Photoshop CS4 Classroom in a Book , By Adobe Creative Team

References:

- UNDERSTANDING ADOBE PHOTOSHOP: Digital Imaging Concepts and Techniques, by Richard Harrington

DATA WAREHOUSING AND DATA MINING

Code	L	T	P/FW	CREDITS
MCA332	2	1	-	3

Course Objective:

This course unit is divided into two parts: one on Data Warehousing and one on Data Mining. Both data warehousing and data mining are advanced recent developments in database technology which aim to address the problem of extracting information from the overwhelmingly large amounts of data which modern societies are capable of amassing. Data warehousing focuses on supporting the analysis of data in a multidimensional way. Data mining focuses on inducing compressed representations of data in the form of descriptive and predictive models. Course gives an in-depth knowledge of both the concepts.

Course Contents:

Module I: Data Warehousing

Introduction to Data Warehouse, its competitive advantage, Data warehouse vs Operational Data, Things to consider while building Data Warehouse

Module II: Implementation

Building Data warehousing team, Defining data warehousing project, data warehousing project management, Project estimation for data warehousing, Data warehousing project implementation

Module III: Techniques

Bitmapped indexes, Star queries, Read only tablespaces, Parallel Processing, Partition views, Optimizing extraction process

Module IV: Data Mining

From Data ware housing to Data Mining, Objectives of Data Mining, the Business context for Data mining, Process improvement, marketing and Customer Relationship Management (CRM), the Technical context for Data Mining, machine learning, decision support and computer technology.

Module V: Data Mining Techniques and Algorithms

Process of data mining, Algorithms, Data base segmentation or clustering, predictive Modeling, Link Analysis, Data Mining Techniques, Automatic Cluster Detection, Decision trees and Neural Networks.

Module VI: Data Mining Environment

Case studies in building business environment, Application of data ware housing and Data mining in Government, National Data ware houses and case studies.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Data Warehousing, Data Mining & OLAP, Alex Berson, Stephen J. Smith, Tata McGraw-Hill Edition 2004.
- Data Mining: Concepts and Techniques, J. Han, M. Kamber, Academic Press, Morgan Kaufman Publishers, 2001
- Data Ware housing: Concepts, Techniques, Products and Applications, C.S.R. Prabhu, Prentice Hall of India, 2001.

References:

- Mastering Data Mining: The Art and Science of Customer Relationship Management, Berry and Lin off, John Wiley and Sons, 2001.
- Data Mining”, Pieter Adrians, Dolf Zantinge, Addison Wesley, 2000.
- Data Mining with Microsoft SQL Server, Seidman, Prentice Hall of India, 2001.

NETWORK FUNDAMENTALS

Code	L	T	P/FW	CREDITS
MCA333	2	1	-	3

Course Objective:

The goal of CCNA Exploration Network Fundamentals course is to introduce you to fundamental networking concepts and technologies. This course will assist you in developing the skills necessary to plan and implement small networks across a range of applications.

Course Contents:

Module I: Living in a Network Centric World

Networks supporting the way we live, Examples of today's popular communication tools, Communication, Network as platform, The Elements of Network, Converged network
The Architecture of Internet, Trends in Networking.

Module II: Communicating over the Network

Introduction, LANs, WANs and Internetworks, Network Addressing

Module III: Application Layer Functionality and Protocols

Introduction, making provision for applications and services, Application layer protocols and services.

Module IV: OSI Transport Layer

Introduction, The TCP protocol –communicating with reliability, Managing TCP sessions, The UDP protocol communicating with low overheads

Module V: OSI Network Layer

Introduction, Networks-dividing host into groups, Routing –How our data packets are handled, Routing process.

Module VI: Addressing the Network - IPv4

Introduction, Address for different purpose, Assigning address, Calculating address, testing the Network layer.

Module VII: Data Link Layer

Introduction, Data Link Layer-Accessing the media .Media Access Control Techniques, Media Access Control Addressing and Framing Data.

Module VIII: OSI Physical Layer

Introduction, The Physical Layer-Communication Signals, Physical Signaling and Encoding, Representing Bits, Physical Media-Connecting Communication.

Module IX: Ethernet

Overview of Ethernet, Ethernet –Communication through the LAN, The Ethernet Frame ,Ethernet Media Access Control, Ethernet Physical Layer, Hubs and Switches, Address Resolution Protocol(ARP)

Module X: Planning and Cabling Networks

Introduction, LANs-Making the Physical connections, Device Selection Factors, Device Interconnecting ,Developing an Addressing Scheme, Calculating the subnets, Device Interconnections.

Module XI: Configuring and Testing Your Network

Configuring CISCO devices –IOS basics, applying a Basic Configuration using CISCO IOS, Verifying Connectivity, Monitoring and Documenting of Networks.

CCNA Exploration: Network Fundamentals (Guided Case Study)

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Cisco Networking Academy Programme CCNA 1 & 2 Companion Guide, 3rd Edn by Pearson Education
- Cisco Networking Academy Programme CCNA 1 & 2 Lab Companion, 3rd Edn by Pearson Education
- Cisco Networking Academy Programme CCNA 1 & 2 Engineering General, 3rd Edn by Pearson Education
- CISCO CCNA-Exploration 4.0, Module 1, Pearson Education.

References:

- Data Communicatios and Networking by Behrouz Forouzan, 3e, Tata McGraw-Hill
- Computer Networks by Andrews S. Tanenbaum, 4e, Pearson Education

Note: This is an online course of Cisco. Online materials provided by Cisco are studied.

C# WITH GUI LAB

Code	L	T	P/FW	CREDITS
MCA323	-	-	2	1

1. WAP to display the size of all the 13 inbuilt data types. (Hint: use 'sizeof')
2. WAP to demonstrate explicit typecasting.
3. WAP to demonstrate implicit typecasting.
4. WAP to accept any number from the user and display it in reverse order.
5. WAP to establish that unreachable code generates a warning. (Hint: Use 'return').
6. WAP to demonstrate the working of bitwise AND, bitwise OR & bitwise NOT operator.
7. Take two integers A and B and calculate the remainder when A is divided by B. Remember that B might assume the value zero. WAP to test the working of short circuit logical operator (AND) in this context.
8. WAP to observe what happens when a switch case falls through. Also notice if the last case is allowed to fall through.
9. WAP to implement 'break' and 'continue'. Eg: A program to only display the even numbers up to ten.
10. WAP to demonstrate the working of 'break' keyword to show that it breaks only the innermost loop.
11. WAP to implement a single parameterized constructor. Also try to observe what if the constructor is not public.
12. WAP which will try to invoke the destructor/ garbage collector by destroying, say 1000 objects.
13. WAP to implement 'this' keyword.
14. WAP to create a 1-D array of integers of size ten and find out the largest value.
15. WAP to create a 2-D array of size 4X3 and display the sum of all elements using 'for each'.
16. WAP to create implicitly typed 1-D array, initialize it with integers and display the second largest value.
17. WAP to demonstrate that objects are passed by reference.
18. WAP to pass an integer argument using reference. (Hint: Use 'ref').
19. WAP that implements a function Max() which accepts multiple arguments of type integer. This function displays the largest value among the arguments provided. (Hint: Use 'params')
20. WAP in C# to create a method Absolute() which returns the absolute value of arguments passed to it which may be of type integer, float or double.
21. WAP to demonstrate the invoking of overloaded constructors through 'this' keyword.
22. WAP to accept 2 strings from the user and display them in dictionary order.
23. WAP to accept two strings from the user and display if they are equal using:
 - a. Compare Method
 - b. Equals Method
 - c. == operator
24. WAP to demonstrate the difference between Ordinal and Current Culture Comparison methods.
25. WAP to accept a string and a character from the user and display the index of the first and last operand of the character in the string.
26. WAP to create two object having data member x and y respectively. Implement a function 'Swap' which swaps the two objects.
27. WAP to create a method named Copy() which accepts an object as argument and returns a copy of that object.
28. Write a console application to pass 3 integers as arguments to Main through the command line and display their sum.
29. WAP to implement a recursive function which calculates the factorial of a given integer argument.
30. WAP to overload the binary operator + which is used to calculate the sum of 2 complex numbers which are implemented as objects. (Hint: a complex number is of the form $X+iY$, where i is $\sqrt{-1}$)
31. WAP to overload the 'true' operator and apply it on an object of type Rectangle. This operator would return true when both the sides of the rectangle object are equal.

32. WAP to use indexers for displaying the sum five integers.
33. WAP to implement property such that it accepts the age of a couple who wants to get married. The property must be designed such that the age of male should be ≥ 21 and of female should be ≥ 18 .
34. WAP to show that when a virtual method is not overridden the base class method is called.
35. WAP to use the sealed modifier to:
 - a) Prevent derivation of the class
 - b) Prevent method over riding.
36. WAP to design a single class which implements an interface and also inherits a class. Both the interface and the base class have members of their own. Create derived class objects and call methods using it. Make suitable assumptions.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

PHOTOSHOP- LAB

Code	L	T	P/FW	CREDITS
MCA324	-	-	2	1

Course objectives: The goal of this course is to explore fundamental techniques in Photoshop. Ideal for students eager to explore Photoshop, work with layer techniques, gain an understanding of how to do basic photo repairs and color enhancements. Group critiques are also included.

- Mastering the effects of the clone and healing brush tools
- Understanding and working with Layers and the Adjustments Panel
- Understanding the basics of Masking
- Transforming and maximizing Smart Objects
- Employing Smart Filters to create interesting effects
- Color correction
- Working with text and vector shapes in PSD
- File formats, resizing, and saving
- Actions and Batch Processing

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

DATA WAREHOUSING AND DATA MINING LAB

Code	L	T	P/FW	CREDITS
MCA325	-	-	2	1

Software Required: Informatica Tool, Cognos, Todd.

List of Programmes:

1. Write a program to implement text mining.
2. Write a program to implement web mining.
3. Write a program to develop snowflake schema.
4. Write a program to develop the tree schema with the help of binary tree.
5. Write a program to implement BFS and DFS with respect to 2-D modeling.
6. Write a program to implement the basic step of informatics tool.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

NETWORK FUNDAMENTALS LAB

Code	L	T	P/FW	CREDITS
MCA326	-	-	2	1

Course Contents:

1.0 Data Stream Capture

- Capture or download an audio stream
- Record the characteristics of the file
- Examine data transfer rates associated with the file

2.0 Observing TCP and UDP using Netstat

- Explain common **netstat** command parameters and outputs.
- Use **netstat** to examine protocol information on a pod host computer.

3.0 TCP/IP Transport Layer Protocols, TCP and UDP

- Identify TCP header fields and operation using a Wireshark FTP session capture.
- Identify UDP header fields and operation using a Wireshark TFTP session capture

4.0 Application and Transport Layer Protocols Examination

- Configure the host computer to capture Application layer protocols.
- Capture and analyze HTTP communication between the pod host computer and a web server.
- Capture and analyze FTP communication between the pod host computer and an FTP server.
- Observe TCP establish and manage communication channels with HTTP and FTP connections

5.0 Examining a Device's Gateway

- Understand and explain the purpose of a gateway address.
- Understand how network information is configured on a Windows computer.
- Troubleshoot a hidden gateway address problem

6.0 Examining a Route

- Use the **route** command to modify a Windows computer routing table.
- Use a Windows Telnet client command **telnet** to connect to a Cisco router.
- Examine router routes using basic Cisco IOS commands.

7.0 Ping and Traceroute

- Use the **ping** command to verify simple TCP/IP network connectivity.
- Use the **tracert/traceroute** command to verify TCP/IP connectivity.

8.0 Examining ICMP Packets

- Understand the format of ICMP packets.
- Use Wireshark to capture and examine ICMP messages.

9.0 IPv4 Address Subnetting Scenario

When given an IP address, network mask, and subnetwork mask, you will be able to determine other information about the IP address such as:

- The subnet address of this subnet
- The broadcast address of this subnet
- The range of host addresses for this subnet
- The maximum number of subnets for this subnet mask
- The number of hosts for each subnet
- The number of subnet bits
- The number of this subnet

10.0 Subnet and Router Configuration

- Subnet an address space per given requirements.
- Assign appropriate addresses to interfaces and document.
- Configure and activate Serial and FastEthernet interfaces.
- Test and verify configurations.
- Reflect upon and document the network implementation

11.0 Frame Examination

- Explain the header fields in an Ethernet II frame.
- Use Wireshark to capture and analyze Ethernet II frames

12.0 Media Connectors Lab Activity

- Test cables using a Fluke620 LAN CableMeter and a Fluke LinkRunner
- Become familiar with the most common functions of a cable tester.
- Test different cables for type and wiring problems

13.0 Address Resolution Protocol (ARP)

- Use Windows **arp** command.
- Use Wireshark to examine ARP exchanges.

14.0 Cisco Switch MAC Table Examination

- Use the Telnet protocol to log into a Cisco Switch.
- Use the Cisco IOS **show mac-address-table** command to examine MAC address and port associations.

15.0 Intermediary Device as an End Device

- Use Wireshark to capture and analyze frames originating from network nodes.
- Examine the origination of frames in a small network

16.0 Establishing a Console Session with HyperTerminal

- Connect a router and computer using a console cable.
- Configure HyperTerminal to establish a console session with a Cisco IOS router.
- Configure HyperTerminal to establish a console session with a Cisco IOS switch.

17.0 Basic Cisco Device Configuration

Configure Cisco router global configuration settings.

- Configure Cisco router password access.
- Configure Cisco router interfaces.
- Save the router configuration file.
- Configure a Cisco switch

18.0 Final Case Study - Datagram Analysis with Wireshark

- How a TCP segment is constructed, and explain the segment fields.
- How an IP packet is constructed, and explain the packet fields.
- How an Ethernet II frame is constructed, and explain the frame fields.
- Contents of an ARP REQUEST and ARP REPLY

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - III

Code	L	T	P/FW	CREDITS
BCS311	1	-	-	1

Course Objective:

To initiate the learners with the basic mechanics of writing skills and facilitate them with the core skills required for communication in the professional world.

Course Contents:

Module I: Mechanics and Semantics of Sentences

Writing effective sentences
Style and Structure

Module II: Developing writing skills

Inter - office communication: Business Letter; E mails; Netiquette
Intra – office communication: Memos, Notices, Circulars, Minutes
Report Writing

Module III: Business Presentations

Planning, design and layout of presentation
Information Packaging
Audience analysis
Audio visual aids
Speaking with confidence
Case Studies

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.

BEHAVIOURAL SCIENCE – III (LEADING THROUGH TEAMS)

Code	L	T	P/FW	CREDITS
BSS311	1	-	-	1

Course Objective:

This course aims to enable students to Understand the concept and building of teams, Manage conflict and stress within team, Facilitate better team management and organizational effectiveness through universal human values.

Course Contents:

Module I: Teams: An Overview

Team Design Features: team vs. group
Effective Team Mission and Vision
Life Cycle of a Project Team
Rationale of a Team, Goal Analysis and Team Roles

Module II: Team & Sociometry

Patterns of Interaction in a Team
Sociometry: Method of studying attractions and repulsions in groups
Construction of sociogram for studying interpersonal relations in a Team

Module III: Team Building

Types and Development of Team Building
Stages of team growth
Team performance curve
Profiling your Team: Internal & External Dynamics
Team Strategies for organizational vision
Team communication

Module IV: Team Leadership & Conflict Management

Leadership styles in organizations
Self Authorized team leadership
Causes of team conflict
Conflict management strategies
Stress and Coping in teams

Module V: Global Teams and Universal Values

Management by values
Pragmatic spirituality in life and organization
Building global teams through universal human values
Learning based on project work on Scriptures like Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002, Harcourt College Publishers
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - III

Code	L	T	P/FW	CREDITS
FLF311	2	-	-	2

Course Objective:

To provide the students with the know-how

- To master the current social communication skills in oral and in written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to 103 Unité 7

Contenu lexical: Unité 6: se faire plaisir

1. acheter: exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver des relations

1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne...rien/personne/plus
4. Questions avec combien, quel...
5. expressions de la quantité
6. ne...plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - III

Code	L	T	P/FW	CREDITS
FLG311	2	-	-	2

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Modal verbs

Modal verbs with conjugations and usage

Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)

Information about Germany in the form of presentations or “Referat”– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case

Dative case, comparison with accusative case

Dative case with the relevant articles

Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns

Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions

Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues

In the Restaurant,

At the Tourist Information Office,

A telephone conversation

Module VII: Directions

Names of the directions

Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions

To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – III

Code	L	T	P/FW	CREDITS
FLS311	2	-	-	2

Course Objective:

To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Contents:

Module I

Revision of earlier semester modules

Set expressions (idiomatic expressions) with the verb *Tener, Poner, Ir...*

Weather

Module II

Introduction to *Gustar...* and all its forms. Revision of *Gustar* and usage of it

Module III

Translation of Spanish-English; English-Spanish. Practice sentences.

How to ask for directions (using *estar*)

Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV

Simple conversation with help of texts and vocabulary

En el restaurante

En el instituto

En el aeropuerto

Module V

Reflexives

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras -Nivel Elemental

CHINESE – III

Code	L	T	P/FW	CREDITS
FLC311	2	-	-	2

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronunciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II

Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between “hii” and “neng”, “keyi”.

Module III

Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g.; fever, cold, stomach ache, head ache.
Use of the modal particle “le”
Making a telephone call
Use of “jiu” and “ca” (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat..etc.

Module IV

The ordinal number “di”
“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.
use of to enter to exit
Structural particle “de” (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.
Grammar use of “li” and “cong”.
Comprehension reading followed by questions.

Module V

Persuasion-Please don't smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast ... etc.
Talking about studies and classmates
Use of “it doesn't matter”
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I, Part-2” Lesson 21-30

SOFTWARE ENGINEERING

Code	L	T	P/FW	CREDITS
MCA401	2	1	-	3

Course Objective:

Students in this course should be able to explain and apply a broad range of concepts from software engineering, spanning all aspects the software engineering process. They should be able to recognize, define, and make correct use of generally accepted software engineering terminology.

Course Contents:

Module I: Introduction

Evolution of Software Engineering, Software Problems, Issues Involved In Software Engineering, Fundamental Qualities of a Software Product, Approaches to Software Engineering, Planning the development Process

Module II: Software Life Cycle Models

Development/Product Life-Cycle Model, Kinds of Software Life-Cycle Model Project Management Concepts, Project Management Activities

Module III: Software Requirement Specification

Requirement Engineering, Requirement elicitation, Requirement analysis, requirement documentation, Case Study.

Module IV: Software Project Planning

Size Estimation, Cost Estimation, Models, COCOMO, COCOMO II, Putnam Resource allocation model, Software Risk Management.

Module V: Software Design

Software Designing Principles Various Strategies, Module Level Concepts, Structured Design Methodologies

Module VI: Software Metrics

Software Metrics, Token Count, Data Structure Metrics, Information Flow Metrics and Metrics analysis.

Module VII: Software Reliability

Basic Concepts, Software quality, software reliability models, Capability maturity models, ISO 9000.

Module VIII: Software Testing

Testing Process, Some terminology, Functional Testing, Structural Testing, Levels of Testing, Debugging and Testing Tools.

Module IX: Software Maintenance

Maintenance Process, Maintenance Model, Estimation of maintenance cost, Regression Testing, Reverse Engineering, Software Re-engineering, Configuration Management and Documetation.

Examination Scheme:

Components	CT	HA/V/Q	ATTD.	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Software Engineering, A Practitioner's Approach, Roger S. Pressman,
- Software Engineering, K.K. Agarwal, Yogesh Singh, New Age International Publishers
- An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa Publication

References:

- Software Engineering Concepts, Richard Fairley

UNIX AND SHELL PROGRAMMING

Code	L	T	P/FW	CREDITS
MCA402	2	1	-	3

Course Objective:

This course provides the students with the skills to use the UNIX operating system platform. Basic UNIX commands for editing and manipulating files, managing processes and interacting with the Bourne and BASH shell are presented via lecture and lab exercises. The course also teaches the participant how to use the programming constructs of the shell language to write shell scripts that may be used to simplify or automate tasks. UNIX commands and Shell Programming will prepare the participants to work on UNIX platform, which is the requirement of each industry. This course is designed to understand the concepts of Unix System for Research and Development.

Course Contents:

Module I: Introduction

History of the UNIX operating system, UNIX Family, Types of Operating Systems, Operating system services, Architecture of the UNIX operating system, Kernel Data Structure, Shell: Types of shells, Files and Directories, Absolute Path and Relative Path, root and hierarchical file structure of Unix, telnet .

Module II: The Buffer Cache

Buffer headers, Structure of the buffer pool, Scenarios for retrieval of a buffer, reading and writing disk blocks, advantages and disadvantages of the buffer cache

Module III: Internal Representation of files

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

Module IV: The Structure of a process and Process Control

Process state and transitions, the context of a process, saving the context of a process, manipulation of the process address space , Process creation, Signals, Process termination, Awaiting process termination, The user ID of a process, Changing the size of a process, System boot and init process, process scheduling

Interprocess Communication and I/O Subsystem

Process tracing, System vs IPC, Network Communication, Sockets, Driver interfaces, Disk Drivers, Terminal Drivers, Streams

Module V: UNIX Commands

Login, password, hostname; creating an account; Virtual consoles; shell and commands; logout; changing password; Files and Directories; pathname; Directory Tree; current working directory; relative pathname; referring to home directories; Commands to move around by path concept; creating new directories; copying files; moving files; Deleting files and directories; looking at files: cat, more, pg, less, head, tail; Comparing files, Searching and listing Files, Wildcards, hidden files; Standard input and output; redirecting input and output; filter; pipes; file permissions; user and group; Interpreting file permissions; Permission Dependencies; Changing permissions: chmod and umask commands; Managing file links; hard links; symbolic links; stopping and restarting jobs, Getting online help; manual pages, regular expression and pattern searching commands grep family; Command Substitution;

Module VI: UNIX Commands

jobs and process: process ID; Job control; foreground and background jobs; suspend and interrupt a process; Backgrounding and killing jobs; print commands; system administrator commands- create user, create group, remove user , starting the system, shutting down the system, runlevels; mounting and unmounting a file system, disk management, environment initialization files, tar

Module VII: Vi Editor

Command mode, insert mode and last line mode; command to delete character, insert line; deleting text, command for moving the cursor; including other files; running shell commands; getting vi help; search and replace commands; changing and deleting text, Change word, Change line, Delete current line, Delete n lines, Delete remainder of Lines; copying and moving; Saving and Exiting.

Module VIII: Shell programming

Shell variables and keywords, User's Initialization file, The dot command, Interactive execution and command line arguments, Setting positional parameters (set command) (\$1,\$2 etc) Shift; Operators (&&, (), &, ||, ;, <, > etc), Regular expressions and pattern matching, substitute shell variables, Test Command, Control Flow, for, if, while, case. string handling and computation using expr, bc; Shell scripts and execution methods.

Examination Scheme:

Components	CT	HA/V/Q	ATTD.	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Kanetkar. "UNIX Shell Programming" BPB
- Sumitabha Das, "UNIX: Concepts and Application", TMH.
- Maurice J. Bach, "Design of the Unix operating System" PHI.

References:

- Prata. "Advanced UNIX-A Programmers Guide" BPB
- Kate Wrightson and Joe Merlino , "Introduction to UNIX"- McGraw Hill

OPEN SOURCE TECHNOLOGY

Code	L	T	P/FW	CREDITS
MCA403	2	1	-	3

Course Objective:

- Write basic PHP scripts that process user input from a web form.
- Use PHP variables, arrays, loops, conditional statements, and operators.
- Create and incorporate PHP functions.
- Integrate PHP scripts with email

Course Contents:

Module I

Introduction : Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History : BSD, The Free Software Foundation and the GNU Project.

Module II

Open Source History, Initiatives, Principle and methodologies. Philosophy : Software Freedom, Open Source Development Model Licences and Patents: What Is A License, Important FOSS Licenses (Apache,BSD,GPL, LGPL), copyrights and copylefts, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization

Module III

Case Studies : Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office.

Module IV

Starting and Maintaining an Open Source Project, Open Source Hardware, Open Source Design, Open source Teaching. and Open source media.

Module V

Open source vs. closed source Open source government, Open source ethics. Social and Financial impacts of open source technology, Shared software, Shared source

Open Source History, Initiatives, Principle and methodologies. Philosophy : Software Freedom, Open Source Development Model Licences and Patents: What Is A License, Important FOSS Licenses (Apache,BSD,GPL, LGPL), copyrights and copylefts, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

- Atkinson, Leon. *Core PHP Programming, 2nd Edition*. New York: Prentice Hall
- Open Source Technology: Concepts, Methodologies, Tools, and Applications (4 Volumes) Information Resources Management Association (USA), 2015
- 'Open Source Technology and Policy' by Fadi P. Deek and James A.M. McHugh

DISTRIBUTED OPERATING SYSTEM

Code	L	T	P/FW	CREDITS
MCA404	2	1	-	3

Course Objective:

This Subject provides students with an in-depth knowledge about the operating system. The former treats the standard principles of single processor system, including processes, synchronization, I/O, deadlocks, Memory Management, File Management systems, security and so on. This subject covers distributed operating system in detail, including communication process, file system and memory management synchronization and so on but this time in the context of distributed systems

Course Contents:

Module I

Modes of communication, System Process, Interrupt Handling, Handling Systems calls, Protection of resources & Resources Management Micro-Kernel Operating System. Distributed Operating System, Issue in the design of Distributed Operating System, Overview of Computer Networks. Inter process communication, Remote Procedure calls, RPC exception handling.

Module II: Clock Synchronization

Logical clocks, Physical clocks, clock synchronization algorithms, Mutual Exclusion, Election Algorithms, Dead locks in Distributed Systems. Thrashing, Heterogeneous DSM, Resource Management (Load Balancing approach, Load Sharing approach), Process Management: process Migration, Thread.

Module III

Overview of shared memory, consistency model, Page based Distributed Shared Memory, Shared –variable Distributed Memory, Object -based Distributed Memory.

Module IV

File models, File access, File sharing, file-caching, File Replication, fault Tolerance, Network File System, (case study, Security in Distributed File system.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

- Distributed Operating Systems 1st Edition by Andrew S. Tanenbaum
- Distributed Systems: Principles and Paradigms (2nd Edition) 2nd Edition, by Andrew S. Tanenbaum, Maarten Van Steen

SOFTWARE ENGINEERING LAB

Code	L	T	P/FW	CREDITS
MCA420	-	-	2	1

Course Contents:

Week I: Introduce the lab environment and tools used in the software engineering lab: WebCT, Rational Rose for UML, MS Project, MS Source Safe (configuration management), Rational Requisite Pro (Software requirements and prerequisite pro), JUnit (Software Testing).

The key objectives are

- Discuss the Project & learn how to write project definition.
- Learn the cycle phases (project management, requirement engineering, software design, prototyping and testing software life).
- Practice the software phases using a project.
- Learn a number of CASE tools and use them in a project within a team work environment.
- Get familiar with UML (modeling language for analysis and design).

Week II: For a given dummy project given to a team, Software process overview must be done using MS source safe

Week III: For the above mentioned Project, Project planning must be done .Also the students should be taught how to write planning documentation using MS Project

1. For the above mentioned Project, Software requirements are found and also teach the students, how to write Planning document using Rational RequisitePro
2. Introduction to UML, Unified Modelling Language and use case diagrams using Rational Rose
3. Develop System modeling (DFD and ER) using Rational Rose
4. Design Flow of events and activity diagram using Rational Rose and how to write SRS document.
5. OO analysis: discovering Classes Interaction diagrams: sequence and collaboration diagrams using Rational Rose
6. Developing Version 1 of Software Design: software architecture and object-oriented design using Rational Rose
7. Developing State Transition Diagram using Rational Rose
8. Developing Component and deployment diagrams for Final Documented Project Report using Rational Rose.
9. Software testing using JUnit and other testing tools.

Note: The above steps should be followed for a given project to a team to teach the students how to write a project.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

UNIX AND SHELL PROGRAMMING LAB

Code	L	T	P/FW	CREDITS
MCA421	-	-	2	1

Sr. No. Shell Program

- 1 Write a shell script which ask your name, age, department, and course and lastly give the syntax to display all your information.
- 2 Write a shell script which asks your Enrolment no., name, name of 3 subjects and marks obtained. Display these fields by using echo and equal operator.
- 3 Write a shell script, declare 5 variables and assign values to them. Display the values in the given order:- 1,5,2,3,4
- 4 Write a shell script that creates a file containing the message that this file is created today i.e. on the current date followed are the users of Unix at this moment and show the list of users.
- 5 Write a shell script that accepts two file names from the command line, copies the first to second file and display the second file.
- 6 Write a shell script that accepts two parameters i.e. two files, append file1 to file2 and display file2.
- 7 Write a shell script that assigns execute permission to a file.
- 8 Write a shell script that accepts one file and directory name and move that file to the directory and show recursive listing and long listing.
- 9 Write a shell script where we create a directory, move to the directory, create a file. Show the present path and display the file.
- 10 Write a shell script that asks your name and invite you on current date for a party and append this message to a file name party.
- 11
 - a) Write a shell script that reads a file name from command line and changes name to filename.logname.
 - b) Display the number of links and size of the file given as the command line argument.
- 12 Write a shell script which displays the date in desired format i.e. Monday 25 September 2006.
- 13 Write a shell script by which you create a branch \usr directory till depth of d5 and using concept of assigning the path to the variables do the movements within this directory path and create two files in each directory from d1.
- 14 Write a shell script and declare two variables A and B. Take static value of A=5 and B=3. Perform all operations on it.
- 15 Write a shell script which accepts a number and checks whether the number is an odd or even number.
- 16 Write a shell script to give the result of student. Take marks of the five subjects, student name, roll no and percentage and show a message whether a student gets division as per the following rules:
70% <-> distinction
60%->1st division
50%->2nd division
<40%->Fail
- 17 Write a shell script which checks the age of the student for swimming. The condition are as follows:
<10- not allowed
10-18- junior pool only
>18- swimming is allowed in depth also
- 18 Write a shell script to find out the gross salary of an employee when the given information is as under:-
 - a) If basic salary is less than Rs.1500/-
HRA = 10% of basic
DA = 90% of basic
 - b) If basic is greater than or equal to Rs.1500/-
HRA = 500/-
DA = 98% of basic
- 19 Write a shell script to enter a year and show a message whether the year is a leap year or not.
- 20 Write a shell script using concept of position parameters which copies one file and display destination file and it should also contain an error message if the source file does not exist.
- 21 Write a shell script to calculate the gross salary of an employee whose basic salary is entered through keyboard. His DA=40% of basic and HRA=20% of basic.
- 22 Write a shell script where distance between two cities is input through the keyboard in km. Convert and print this distance in meters, feet, inches and cm.

- 23 Write a shell script to find area and perimeter of rectangle.
- 24 Write shell scrip to find area and circumference of the circle.
- 25 Write a shell script to find sum of digits of a number and check whether the number is palindrome or not.
- 26 Pass a filename as command line argument to script which finds
- (i) Whether file exists or not.
 - (ii) Display the message what type of file it is.
 - (iii) (a) If the file is an ordinary file check its read permission. If available display the file else display message read permission denied. (b) Check its write permission and if available append that file by your name and course, else display error message. (c) Check execute permission & if available shows the output of that file.
 - (iv) (a) If it's a directory check its read permission, if available list the directory. (b) Check its write permission; if available make a sub-directory in that directory. Create two file in that sub-directory that you created just now.
- 27 Write a menu driven program:-
- a) Place the pwd of user.
 - b) List the directory of user.
 - c) Long listing the directory of the user and at the same time this long listing is to be stored in a file.
 - d) Create a file in your directory and copy this file in your directory.
 - e) Move the specified file to your parent directory.
 - f) Rename the specified file in the current directory.
 - g) Make a sub directory in the current directory and change its permission by taking away all the permission of group and others.
- 28 Write a Menu driven program
- a) Check the contents of /etc/passwd file.
 - b) List of users who have currently logged in.
 - c) Pwd
 - d) Exit
- 29 Write a shell script where you accept a character and you have to echo message whether the entered character is a small case, capital case or a digit or a special symbol. Display error message if more than one character is entered.
- 30 Write a shell script where you accept a word and echo the message
- a) Whether the word begins with vowel, consonant or a digit.
 - b) Check whether the word begins with small case vowel or capital case vowel.
 - c) Checks whether the word ends with a digit.
- 31 Write a shell script where you check whether
- a) The word begins with "a" and ends with "t"
 - b) The word begins with "s" and ends with "p"
 - c) Any word with fixed length of 4 characters.
 - d) Display the word starting with "z" and ending with "l"
- 32 Write a shell script to print if its:
- a) Morning time, print "Good Morning"
 - b) Afternoon time, print "Good Afternoon"
 - c) Evening time print "Good Evening"
- 33 Write a shell script for printing calendar. Accepts month, year and name as command line argument.
- 34 Write a shell script to find a total of
- a) First 9 integers
 - b) Any five numbers
 - c) Do option (b) from command line
- 35 Write a shell script that takes a search string and filename from the terminal and display the result.
- 36 Write a shell script that takes pattern and filename as command line arguments and displays the results appropriately i.e. pattern found/pattern not found
- 37 Write a shell script that accepts only three arguments from command line. The first is the pattern string, the second is the filename in which the pattern is to be searched and the third is the filename in which result is to be stored.
- 38 Write a shell script that accepts a filename as a command line and finds out if it's a regular file or a directory. If it's regular file, then perform various tests to see if it's readable, writeable, executable etc.
- 39 Write a shell script that computes the factorial of a given number.
- 40 Write a shell script that works like a calendar reminding the user of certain things depending on the day of the week.

- 41 Write a shell script that changes the extension of group files from text to doc
- 42 Write a shell script which will redirect the output of the date command without the time into a file.
- 43 Write a shell script to execute endlessly a loop which displays contents of the current directory, disk space status, and sleep for 30seconds and display the users currently logged in on the screen.
- 44 Write a shell script that receives two filenames as arguments. It should check whether content of the two file is same or not. If they are same, second file should be deleted.
- 45 If a number is input through keyboard, write shell script to calculate sum of digits.
- 46 Write a shell script that performs a count down either from 10 or from the value that is entered by the user.
- 47 Write a shell script that examines each file in the current directory. Files whose names end in old are moved to a directory named old files and files whose name ends with .c are moved to directory named cprograms.
- 48 Write a shell script which takes a command line argument of kms and by default converts that number into meters. Also provide options to convert km to dm and km to cm.
- 49 Write a shell script for renaming each file in the directory such that it will have the current shell PID as an extension. The shell script should ensure that the directories do not get renamed.
- 50 Write a shell script to print Fibonacci series.
- 51 Write a shell script that will receive any number of filenames as arguments. The shell script should check whether such file already exists. If they do, then it should be reported. The files that do not exist should be created in a sub directory called mydir. The shell script should first check whether the subdirectory mydir exists in the current directory. If it doesn't then it should be created. If it does then it should be reported along with the number of files that are currently present in mydir.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

OPEN SOURCE TECHNOLOGIES LAB

Code	L	T	P/FW	CREDITS
MCA422	-	-	2	1

1. Write the process of installation of web server.
2. Write programs to print all details of your php sever. Use phpinfo().
3. Write a program to give demo of ECHO and PRINT command.
4. Write a program sort ten number by using array.
5. Create a database in MySql and connect that database from PHP.
6. Write a program to Update, insert and delete the values of table in Question No – 9 database

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ENTERPRISE RESOURCE PLANNING

Code	L	T	P/FW	CREDITS
MCA410	2	1	-	3

Course Objective:

The objective of the course is to give an introduction to Enterprise Resource Planning, its benefits, ERP systems, ERP Implementation Methodology, ERP Architectures. It also focuses on concepts of Extended ERP, Supply Chain Management and Customer Relationship Management.

Course Contents:

Module I: Introduction

Definition, Evolution of ERP, Characteristics, Features, Components and needs of ERP, ERP Vendors, BPR, System Benefits & Limitations of ERP Packages

Module II: Generic Model of ERP

Generic model of ERP system, Core Modules functionality, Types of ERP architecture, Client Server Architecture, Web-based Architecture, Service Oriented Architecture (SOA)

Module III: Implementation Methodology of ERP

Difficulty in selecting ERP, Approach to ERP selection, Request for Proposal approach, proof-of-concept approach, General Implementation approach of ERP, Vanilla Implementation, Evaluation Criteria of ERP packages, Project Implementation Team Structure

Module IV: Business Process Reengineering

Organizational Change Management, Business Process Change, BPR Methodology, Current BPR Tools, Enabling best technology practices, Benchmarking

Module V: Enterprise Modeling and Integration of ERP

Need to focus on Enterprise Integration/ERP, Information mapping, Role of common shared Enterprise database, System Integration, Logical vs. Physical System Integration, Benefits & limitations of System Integration, ERP's Role in Logical and Physical Integration

Module VI: Introduction to SAP, Oracle APPS

SAP, Integrated SAP Model, SAP Architecture, SAP R/3 System & mySAP, SAP Modules, Oracle Apps, Oracle AIM Methodology, Oracle APPS Modules

Module VII: Supply chain management and ERP

Definition, Supply Chain Council's SCOR Model, Stevens Model of Supply Chain Management, Aims of SCM, SCM Key Drivers, Collaborative Design & Product Development, Benefits of SCM, ERP Vs SCM, Key SCM Vendors

Module VIII: Customer Relationship Management and ERP

CRM Evolution, CRM Delivery Processes, CRM support Processes, CRM Analysis Processes, CRM Components, CRM Packages & Vendors

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

- Enterprise Systems For Management, Luvai F. Motiwalla, Jeff Thompson, Pearson Education.
- Wikipedia Links for SAP, Oracle APPS

SOFTWARE PROJECT MANAGEMENT

Code	L	T	P/FW	CREDITS
MCA411	2	1	-	3

Course Objective:

This module will introduce the area of software project management, presenting basic techniques and approaches and aiming to develop a critical awareness of the challenges and shortcomings of the area.

Course Contents:

Module I: Introduction of Software Project Management & Project Planning

What is Software? What is Project? What is Management? Activities covered by software project management, some ways of categorizing software projects, the project as a system, Problems with software projects, Management control, Requirement specification, Information and control in organization, Introduction of Step Wise project planning, Step: 0-4, Step: 5-10 of project planning.

Module II: Risk Management

The nature of Risk, Risk identification, Risk analysis, Risk Examination, Risk Assessment, Reducing Risk, Evaluating risks to the schedule.

Module III: Project Examination

Strategic assessment, Technical assessment, Cost-benefit analysis (no numerical), cost-benefit Examination techniques, Cash flow forecasting, risk Examination.

Module IV: Overview of Appropriate project approach & Software Effort Estimation

Project models, Examples of project models, the basis of software estimation, Problems with over and under estimates, where are estimates done? Software effort estimation techniques: LOC, Function Point (no numerical), COCOMO: a parametric model

Module V: Overview of Management

Levels of management, Management as a control system, Functions of Management, Objectives, Characteristics and Impact of management.

Module VI: Activity Planning & Resource Allocation

Objective of activity planning, when to Plan, Project Schedules, Projects and activities, Sequencing and scheduling activities, Nature of resources, Identifying resource requirements, Scheduling resources, Cost Schedules, Scheduling sequences.

Module VII: Monitoring and Control & Managing people and organizing team

Creating the framework, collecting the data, Visualizing progress and change control, Organizational structure and behaviour, selecting right person for a job, motivation, leadership, working in a group.

Module VIII: Software Quality

Place of s/w quality in project planning, importance of s/w quality, Defining s/w quality, ISO 9126, ISO 9000, ISO 9003, Practical s/w quality measures, Product versus process quality management, External standards, Techniques to help enhance s/w quality, CMM Model, Concept of Six Sigma

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Software Project Management (Second Edition), BOB Hughes and Mike Cotterell, TMH

References:

- Software Engineering – David Gustafson (Schaum's Series)
- Software Engineering – Pressmen

BUSINESS INTELLIGENCE AND ITS APPLICATIONS

Code	L	T	P/FW	CREDITS
MCA412	2	1	-	3

Course Objective:

This course provides an introduction to Business Intelligence, including the processes, methodologies, infrastructure, and current practices used to transform business data into useful information and support business decision-making. Business Intelligence requires foundation knowledge in data storage and retrieval, thus this course will review logical data models for both database management systems and data warehouses.

Course Contents:

Module I: Introduction to Business Intelligence

Introduction to digital data and its types- structured, semi-structured and unstructured, Introduction to OLTP and OLAP (MOLAP, ROLAP, HOLOAP), BI Definitions and Concepts, BI Framework, Data Warehousing concepts and its role in BI, BI Infrastructure Components- BI Process, BI Technology, BI Roles & Responsibilities, Business Applications of BI, BI best practices

Module II: Basics of Data Integration (Extraction Transformation Loading)

Concepts of data integration, needs and advantages of using data integration, introduction to common data integration approaches, Meta data- types and sources, Introduction to data quality, data profiling concepts and application, Introduction to ETL using Kettle

Module III: Data Introduction to Multi-Dimensional Data Modeling

Introduction to data and dimension modeling, multidimensional data model, ER Modeling VS multi-dimensional modeling, concepts of dimension, facts, cubes, attribute, hierarchies, star and snowflake schemas, introduction to business metrics and KPIs, creating cubes using Microsoft Excel.

Module IV: Basics of Enterprise Reporting

A typical enterprise, Malcolm Baldrige- quality performance framework, balanced scorecard, enterprise dashboard, balanced scorecard VS enterprise dashboard, enterprise reporting using MS Access/ MS Excel, best practices in the design of enterprise dashboards.

Examination Scheme:

Components	CT	HA/V/Q	ATTD.	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Fundamentals of Business Analytics – R. N. Prasad & Seema Acharya,

References:

- Business Intelligence (2nd Edition), Efraim Turban, Ramesh Sharda, Dursun Delen, David King
- Delivering Business Intelligence with Microsoft SQL Server 2012, Brian Larson

WINDOWS PROGRAMMING USING VC++

Code	L	T	P/FW	CREDITS
MCA413	2	1	-	3

Course Objective:

To make the students to understand the windows programming concepts including Microsoft Foundation Classes.

- To introduce the concepts of windows programming
- To introduce GUI programming using Microsoft Foundation Classes
- To enable the students to develop programs and simple applications using Visual C++

Course Contents:

Module I: Windows Programming

Windows environment – a simple windows program – windows and messages – creating the window – displaying the window – message loop – the window procedure – message processing – text output – painting and repainting – introduction to GDI – device context – basic drawing – child window controls

Module II: Visual C++ Programming – Introduction

Application Framework – MFC library – Visual C++ Components – Event Handling – Mapping modes – colors – fonts – modal and modeless dialog – windows common controls – bitmaps

Module III: The Document and View Architecture

Menus – Keyboard accelerators – rich edit control – toolbars – status bars – reusable frame window base class – separating document from its view – reading and writing SDI and MDI documents – splitter window and multiple views – creating DLLs – dialog based applications

Module IV: Activex and Object Linking and Embedding (Ole)

ActiveX controls Vs. Ordinary Windows Controls – Installing ActiveX controls – Calendar Control – ActiveX control container programming – create ActiveX control at runtime – Component Object Model (COM) – containment and aggregation Vs. inheritance – OLE drag and drop – OLE embedded component and containers – sample applications

Module V: Advanced Concepts

Database Management with Microsoft ODBC – Structured Query Language – MFC ODBC classes – sample database applications – filter and sort strings – DAO concepts – displaying database records in scrolling view – Threading – VC++ Networking issues – Winsock – WinInet – building a web client – Internet Information Server – ISAPI server extension – chat application – playing and multimedia (sound and video) files.

Examination Scheme:

Components	CT	HA/V/Q	A	EE
Weightage (%)	15	10	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Charles Petzold, “Windows Programming”, Microsoft press, 1996 (Unit I – Chapter 1-9)
- David J. Kruglinski, George Shepherd and Scot Wingo, “Programming Visual C++”, Microsoft press, 1999 (Unit II – V)

References:

- Steve Holtzner, “Visual C++ 6 Programming”, Wiley Dreamtech India Pvt. Ltd., 2003.

REAL TIME SYSTEMS

Code	L	T	P/FW	CREDITS
MCA414	2	1	-	3

The experiments will be based on the topics covered in the corresponding theory Course.

Introduction: Definition, Issues in Real Time Computing, Structure of a Real Time System. Task Classes

Module I: Characterizing Real Time Systems and Tasks

Introduction, Performance measures for real time systems: Traditional performance measures, Performability, Cost functions and hard Deadlines Task Assignment and Scheduling: Introduction , Classical

Module-II: Uniprocessor scheduling algorithms

Rate Monotonic, EDF algorithm, Task assignment, Fault tolerant Scheduling

Module-III: Real Time Databases

Basic definitions, Real time Vs General Purpose databases, Main Memory databases, concurrency control issues, databases for hard real time systems Real Time Communication: Introduction, Architectural Issues,

Module IV: Protocols

Contention based protocols, Token based protocols, Deadlines based protocols, Stop and Go Multihop protocol, The polled bus protocol, Hierarchical round robin protocol.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

Text:

- Real - Time Systems Paperback – 2002 by Jane W. S. Liu

Reference Books

- Real-Time Systems Design and Analysis: Tools for the Practitioner Hardcover – Import, 23 Dec 2011 by Phillip A. Laplante (Author), Seppo J. Ovaska
- Real - Time Systems Paperback – 2006 by Rajib Mall
- "Real Time Systems"-C. M. Krishna and Kang G. Shin
-

ASP.NET

Code	L	T	P/FW	CREDITS
MCA430	2	1	-	3

Course Objective:

To create web based applications using ASP.NET.

Course Contents:

Module I: Introduction to .NET technologies

Features of .NET, .NET Framework, CLR, MSIL, .NET class library, .NET Languages, CTS, assemblies, manifest, and metadata, What is ASP.NET?, Difference between ASP and ASP.NET.

Module II: Controls in ASP.NET

Overview of Dynamic Web page, Understanding ASP.NET Controls, Applications, Web servers, Installation of IIS. Web forms, web form controls -server controls, client controls. Adding controls to a web form, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box. Adding controls at runtime. Running a web Application, creating a multiform web project. Form Validation: Client side validation, server Side validation, validation Controls: Required Field Comparison Range. Calendarcontrol, Ad rotator Control, Internet Explorer Control.

Module III: Overview of ADO.NET and XML

What is ADO.NET, from ADO to ADO.NET. ADO.NET architecture, Accessing Data using Data Adapters and Datasets , using Command & Data Reader, binding data to data bind Controls, displaying data in data grid, XML basics, attributes, fundamental XML classes: Document, text writer, text reader. XML validations, XML in ADO.NET, The XML Data Document.

Module IV: ASP.NET Applications

Creating, tracking, caching, error handling, Securing ASP.NET applications- form based applications, window based application.

Module V: Web services

Introduction, State management- View state, Session state, Application state, Building ASP.NET web services, working with ASP.NET applications, creating custom controls.

Examination Scheme:

Components	CT	HA/V/Q	A	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- ASP.NET Unleashed by Stephen Walther, SAMS publications

References:

- ASP.NET, Wrox Publications
- ASP.NET and VB.NET, Wrox Publication
- ASP.NET and C#.NET, Wrox publication.

FLASH

Code	L	T	P/FW	CREDITS
MCA431	2	1	-	3

Course Objective:

- Become familiar with the Flash authoring environment and Flash terminology
- Gain understanding of fundamental Flash paradigms (Stage, Symbols, Library, Timeline)
- Create simple, tasteful animation effects
- Use buttons and ActionScript 3.0 to enable basic user interaction
- Learn to export and deploy Flash content on the Web

Course Contents:

Module I:

Introduction to Flash: Introduction to Flash, Features of Flash, Application System Requirement, Installation, Flash Interface, Work Area, Movie, Scenes, Layers, Frames, Importing, saving a file

Basic Shapes : Introduction to tools, creating Basic Shapes, Modifying Basic Shapes, Adding Colors (Color Mixture), Basic Lines & Curves, creating Lines, Features of Lines, Brush, Eyedropper, Eraser tools, Features in Brush & Dropper, Creating Curves Eraser Tools.

Module II:

Working with Text, Layers & Symbols: Introduction to text, working with text tools, features of text tool, exporting images, Introduction to Layer, Introduction to frames, working with Layers, Working with Frames, Working with Shapes, Working with Motion-Guide Layer, Layer Masking, Introduction to Symbols, Library in Flash, Creating Symbols, Features of Symbols, Effect to the symbol

Working With Sounds: Introduction, Importing Sounds, Adding Sounds to a movie, Adding Sound to a button, Editing sound, starting & stopping sounds at key-frames, compressing sounds for exports, exporting sound in flash movie

Module III:

Scripting in Flash : Introduction, Understanding Action Script, using action panel, Normal mode, Expert mode, using external editor, using debugger, using output windows, using movie explorer, where does action script go?, Action Script uses OOP, Variables and Data Types, Basic Action – Introduction, How to go to a frame & scene, playing & stopping movies, stopping all sounds, jumping to a URL, Loading & Unloading additional movies, checking whether a frame is loaded, mouse event, Conditional Operators – introduction, If-Else, If-Else-if, if-Else-if layer, Operators precedence, determining multiple responses (Game of quotes), Looping Handling Events – looping, Framework, calendar maker, mouse action & event, key press, Keyboard, Key Objects, Mouse objects, clip events, drag & drop a cursor, Properties, Functions and duplication of a movie – Introduction, Settings, Properties, Property text, functions, using sub-strings, user-defined functions, duplication a movie

Module IV:

Working with Movies : Publishing Flash Movie- Introduction, Testing movie, download performance, About generator, publishing a flash player movie, publishing HTML for flash player files, publishing GIF files, publishing JPEG files, Preview Publishing formats and setting, PNG sequence & PNG image, HTML publishing Templates, Creating an image map, editing HTML settings

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Beginner's Guide to Adobe Flash/Text : wiki books

References:

- Flash Professional CS5: Visual Quickstart Guide by Katherine Ulrich
- Adobe Flash CS5 Professional Digital Classroom Fred Gerantabee - Wiley Publisher

ADVANCE JAVA

Code	L	T	P/FW	CREDITS
MCA432	2	1	-	3

Course Objective:

The objective is to equip the students with the advanced feature of contemporary java which would enable them to handle complex programs relating to managing data and processes over the network. The major objective of this course is to provide a sound foundation to the students on the concepts, precepts and practices, in a field that is of immense concern to the industry and business.

Course Contents:

Module I

Introduction of Swing, Swing Components, Look and Feel for Swing Components, Introduction to Multimedia Programming

Module II

Introduction to Servlets, Servlet Life Cycle, Servlet based Applications, Servlet and HTML. JSP: Introduction to JSP, JSP implicit objects, JSP based Applications

Module III

ODBC and JDBC Drivers, Connecting to Database with the java.sql Package, Using JDBC Terminology; Evolving Nature of Area

Module IV

Enterprise Java Beans:-EJB roles—EJB Client-Object -container-Transaction Management—implementing a Basic EJB Object-Implementing session Beans-Implementing Entity Beans-Deploying an enterprise Java Beans Object-Changes in EJB1.1 specification.

Module V

The J2EE Platform, The J2EE connector Architecture, J2EE Packaging and Deployment
Overview of Other Java Technologies : Java Message Service (JMS), Java in small memory space (PDA), Distributed Computing (J2EE, CORBA, DCOM)

Examination Scheme:

Components	CT	HA/V/Q	A	EE
Weightage (%)	15	10	5	70

CT: Class Test, HA: Home Assignment, V/Q: Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Java 2 Unleashed (Techmedia – SAMS) By Jamie Jaworski
- Professional Java Server Programming (a Press) By Allamaraju
- Developing Java Servlets (Techmedia – SAMS) By James Goodwill
- Using Java 1.2 Special Edition (PHI) By Webber

References:

- David Flanagan, Jim Parley, William Crawford & Kris Magnusson , Java Enterprise in a nutshell- A desktop Quick reference -O'REILLY, 2003
- Stephen Ausbury and Scott R. Weiner, Developing Java Enterprise Applications, Wiley-2001
- Jaison Hunder & William Crawford, Java Servlet Programming, O'REILLY, 2002
- Dietal and Deital, "JAVA 2" PEARSON publication

ADVANCED DBMS

Code	L	T	P/FW	CREDITS
MCA433	2	1	-	3

Course Objective:

The objective of this course is to expose the students to the implementation techniques of database system. This course explains techniques for query processing and optimization with transaction and concurrency control techniques.

Course Contents:

Module I: Database System Architectures and the System Catalog

System Architectures for DBMS, Catalogs for relational DBMS, System Catalog Information in ORACLE, Other catalog Information accessed by DBMS Software Modules, Data Dictionary and Data Repository Systems.

Module II: Data Storage and Indexing

Storage and File Structures: Overview of Physical Storage media, RAID, Storage access, file organization, Organization of records and files

Indexing & Hashing: Introduction, Ordered index, B+ tree Index files, B-Tree index files, static hashing, dynamic hashing, comparison of ordered indexing and hashing, multiple key access.

Module III: Query Processing and Optimization

Translating SQL Queries into Relational Algebra, Basic Algorithms for executing Query Operations, Using Heuristics in Query Optimization, Using Selectivity and Cost Estimates in Query Optimization, Overview of Query Optimization in ORACLE, Semantic Query Optimization,

Module IV: Transaction Processing Concepts

Introduction to Transaction Processing, Transaction and System Concepts, Characterizing Schedules, Concurrency Control Techniques, Database Recovery Concepts & Techniques. Transaction supports in SQL.

Module V: Parallel Databases

Introduction, I/O Parallelism, Interquery Parallelism. Intraquery Parallelism. Intraoperation, Parallelism, Interoperation, Parallelism, Design of Parallel Systems.

Module VI: Distributed Databases

Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transaction, Commit Protocols, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distributed Databases.

Module VII: Advanced Data Types and New Applications

Motivation Time in Databases, Spatial and Geographic Data, Multimedia Databases, Mobility and Personal Databases.

Examination Scheme:

Components	CT	HA/V/Q	A	EE
Weightage (%)	15	10	5	70

Text & References:

Text :

- Korth, Silbertz, Sudarshan, "Database Concepts". McGraw Hill.

References:

- Elmasari, Navathe, "Fundamentals of Database Systems", Addison Wesley.
- Majumdar & Bhattacharya, "Database Management System", Tata McGraw Hill.
- Date C J." An Introduction to Database Systems", Addison Wesley

ROUTING PROTOCOLS AND CONCEPTS

Code	L	T	P/FW	CREDITS
MCA434	2	1	-	3

Course Objective:

The goal of CCNA Exploration Routing Protocols and Concepts course is to develop an understanding of how a router learns about remote networks and determines the best path to those networks. This course includes both static routing and dynamic routing protocols.

Course Contents:

Module I: Intro to Routing and Packet Forwarding

Introduction, Inside the Router, CLI Configuration and Addressing, Building the Routing Tables, Path Determination and Switching Functions.

Module II: Static Routing

Introduction, Routers and Network, Router Configuration Review, Exploring Directly Connected Networks, Static Routes with “Next Hop”, Addresses, Static Routes with Exit Interface, Summary and Default Static Routes, Managing and Troubleshooting Static Routes.

Module III: Introduction to Dynamic Routing Protocols

Introduction, Classifying Dynamic Routing Protocols, Metrics, Administrative Distance, Routing Protocols and Subnetting Activities.

Module IV: Distance Vector Routing Protocols

Introduction to Distance Vector Routing Protocols, Network Discovery, Routing Table Maintenance, Routing Loops, Distance Vector Routing Protocols Today.

Module V: RIP Version - I

Introduction, RIP v1, Distance Vector, Classful Routing Protocols, Basic RIPv1 Configuration, Verification and Troubleshooting, Automatic Summarization, Default Route and RIP v1.

Module VI: VLSM and CIDR

Introduction, Classful and Classless Addressing, VLSM, CIDR, VLSM and Route Summarization Activity.

Module VII: RIP Version - II

Introduction, RIPv1 Limitations, Configuration RIPv2, VLSM & CIDR, Verifying & Troubleshooting RIPv2.

Module VIII: The Routing Table – A Close Look

Introduction, the Routing Table Structure, Routing Table Lookup Process, Routing Behaviour.

Module IX: EIGRP

Introduction to EIGRP, Basic EIGRP Configuration, EIGRP Metric Calculation, DUAL, More EIGRP Configuration.

Module X: Link State Routing Protocols

Introduction, Link State Routing, Implementing Link State Routing Protocols.

Module XI: OSPF

Introduction to OSPF, Basic OSPF Configuration, The OSPF metric, OSPF and Multi-access Networks, More OSPF Configuration.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:***Text***

- Cisco Networking Academy Programme CCNA 1 & 2 Companion Guide, 3rd Edn by Pearson Education
- Cisco Networking Academy Programme CCNA 1 & 2 Lab Companion, 3rd Edn by Pearson Education
- Cisco Networking Academy Programme CCNA 1 & 2 Engineering General, 3rd Edn by Pearson Education
- CISCO CCNA-Exploration 4.0, Module 2, Pearson Education.

References:

- Data Communications and Networking by Behrouz Forouzan, 3e, Tata McGraw-Hill
- Computer Networks by Andrews S. Tanenbaum, 4e, Pearson Education

Note: This is an online course of Cisco. Online materials provided by Cisco are studied.

GAME PROGRAMMING USING GREENFOOT

Code	L	T	P/FW	CREDITS
MCA435	2	1	-	3

Course Objective: The objective of the course is to enable students to develop graphical computer programs, such as simulations and games, using the Java Programming Language and the Greenfoot environment. Greenfoot allows us to play. And that does not only mean playing computer games; it means playing with programming: we can create objects, move them around on screen, call their methods, observe what they do, all interactively and easily.

Course Contents

Module 1: Getting to know Greenfoot

Objects and classes, Interacting with objects, Return types, Parameters, Greenfoot execution, Understanding the class diagram

Module 2: The first program: Little Crab

The Little Crab scenario, Making the crab move, Turning, Dealing with screen edges, Adding random behavior, Adding worms, Eating worms, Creating new methods, Adding a Lobster, Keyboard control, Ending the game, Adding sound

Module 3: Finishing the crab game

Adding objects automatically, Creating new objects, Animating images, Greenfoot images, Instance variables(fields), Using actor constructors, Alternating the images, The if/else statement, Counting worms

Module 4: Sharing your scenarios

Exporting your scenario, Export to application, Export to a web page, Publishing on the Greenfoot Gallery

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Texts & References:

Text:

Introduction to Programming with Greenfoot: Object-Oriented Programming in Java with Games and Simulations, Michael Kölling

References:

Java The Complete Reference (English) 8th Edition, McGraw Hill Education (India) Private Limited, Herb Schildt

Web Links:

<http://www.greenfoot.org/doc>

<http://www.greenfoot.org/doc/joy-of-code>

ASP.NET LAB

Code	L	T	P/FW	CREDITS
MCA423	-	-	2	1

Course Contents:

- Use of Controls in creating web pages
- Creating sessions
- Creating Custom controls
- Implementing security

List of Experiments

1. Program to display the addition, subtraction, multiplication and division of two number using console applications.
2. Program to display the first 10 natural numbers and their sum using console application.
3. Program to display the addition using the windows application.
4. Write a program to convert input string from lower to upper and upper to lower case.
5. Write a program to simple calculator using windows application.
6. Write a program working with Page using ASP.Net.
7. Write a program working with forms using ASP.NET.
8. Write a program to connectivity with Oracle database.
9. Write a program to access data source through ADO.NET.
10. Write a program to manage the session.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

FLASH LAB

Code	L	T	P/FW	CREDITS
MCA424	-	-	2	1

List of Programs:

1. Create the animation of flying bird in flash.
2. Create the animation of walking man with his arms and legs moving.
3. Create the animation of Virtual typewriter.
4. Show a example of Masking in flash.
5. Make an animation of bouncing ball using flash.
6. Create the animation of moving Car in flash.
7. Make the blinking colorful text in flash.
8. Make a scenery showing rising sun in it using flash.
9. Show a flower growing in a flower pot.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ADVANCE JAVA LAB

Code	L	T	P/FW	CREDITS
MCA425	-	-	2	1

Course Contents:

Programming Language: Java

Assignments:

- WAP to display label on a frame with the help of JFrame
- WAP to display six buttons on a panel using JFrame.
- WAP. To display an image and a string in a label on the JFrame.
- WAP that implement a JApplet that display a simple label
- WAP that implement a JApplet and display the following frame
 - a. Customer name
 - b. Customer number
 - c. Age
 - d. Address
- WAP to access a table Product Master from MS-Access using Java code.
- WAP that implement a simple servlet program.
- WAP for authentication, which validate the login-id and password by the servlet code.
- WAP to connecting a database using user-id and password.
- WAP to insert data into the database using the prepared statement.
- WAP to read data from the database using the ResultSet.
- WAP to read data send by the client (HTML page) using servlet.
- WAP to include a HTML page into a JSP page.
- WAP to handle the JSPException.
- WAP to read data send by a client (HTML page) using JSP.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ADVANCED DBMS LAB

Code	L	T	P/FW	CREDITS
MCA426	-	-	2	1

Course Contents:

Software Required: MS SQL Server

1. RDBMS Basics and SQL Server Installation

2. Transact-SQL = SQL Language on SQL Server

- Review of tables and SQL Server terminology
 - o Tables, data types and terminology
 - o Foreign Keys
- SQL Server data and metadata storage
- DDL: Create, Alter, Drop
- DML: Insert, Update, Delete, Select
- sp_help to display database and table structure

3. SQL – SELECT Statement variations on SQL Server

- SQL expressions
- Column aliases
- Views
- Joins
- Relationships

4 SQL - DDL and INSERT, UPDATE, DELETE on SQL Server

- CREATE TABLE and temporary tables
- Collation for the server, database and table column
- Accessing metadata programmatically
- INSERT statement
 - o IDENTITY property and UNIQUEIDENTIFIER data type
 - o Inserting from a SELECT statement
- UPDATE statement
- DELETE statement
 - o TRUNCATE TABLE

5. Security and Managing Databases

- Creating new login using EM and command line
- Managing SQL Server Databases
 - o Creating a simple database
 - o Renaming and dropping a database
- Four ways to copy and entire database
- Detach and attach a database
- Using DBCC command for database maintenance

6 MSS Connectivity, Import and Export

- Connectivity to a SQL Server
 - o Database Drivers and Networking Components
- Importing and Exporting Data
 - o DTS - Data Transformation Services Concepts
 - o bcp and BULK INSERT

7 Transaction Control, Backup and Restore

- Emptying the Transaction Log = Truncate Log
- Restoring a Database
 - o Restore Dialog in EM
 - o RESTORE Command
- Select Into and Bulk Copy (bcp)
- Designing a Database For Recoverability

- Copy a Database using BACKUP

8 SQL Agent, Transact-SQL

- SQL Agent
- Configuring SQL Agent
- Dynamic SQL - Build an SQL statement as string

9 Stored Procedures, User Functions, Triggers

- Subprograms
 - o Creating Stored Procedure
 - o Using Query Analyzer Stored Procedure Debugger -- MSS 2000 QA
 - o Creating Cursors
- Creating User Defined Functions (UDFs)
- Creating Triggers

10 Performance - Indexes and SQL Profiler

- o Creating an Index
- o Testing the Index - Index Performance on Medium-sized Table

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ROUTING PROTOCOLS AND CONCEPTS LAB

Code	L	T	P/FW	CREDITS
MCA427	-	-	2	1

Course Contents:

1.0 Cabling a Network and Basic Router Configuration

- Cable devices and establish console connections.
- Erase and reload the routers.
- Perform basic IOS command line interface operations.
- Perform basic router configuration.
- Verify and test configurations using show commands, ping and traceroute.
- Create a startup configuration file.
- Reload a startup configuration file.
- Install a terminal emulation program.

2.0 Basic Router Configuration

- Cable a network according to the Topology Diagram given by Lab Coordinator
- Erase the startup configuration and reload a router to the default state.
- Perform basic configuration tasks on a router.
- Configure and activate Ethernet interfaces.
- Test and verify configurations.
- Reflect upon and document the network implementation.

3.0 Challenge Router Configuration

- Subnet an address space given requirements.
- Assign appropriate addresses to interfaces and document.
- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Perform basic configuration tasks on a router.
- Configure and activate Serial and Ethernet interfaces.
- Test and verify configurations.
- Reflect upon and document the network implementation.

4.0 Basic Static Route Configuration

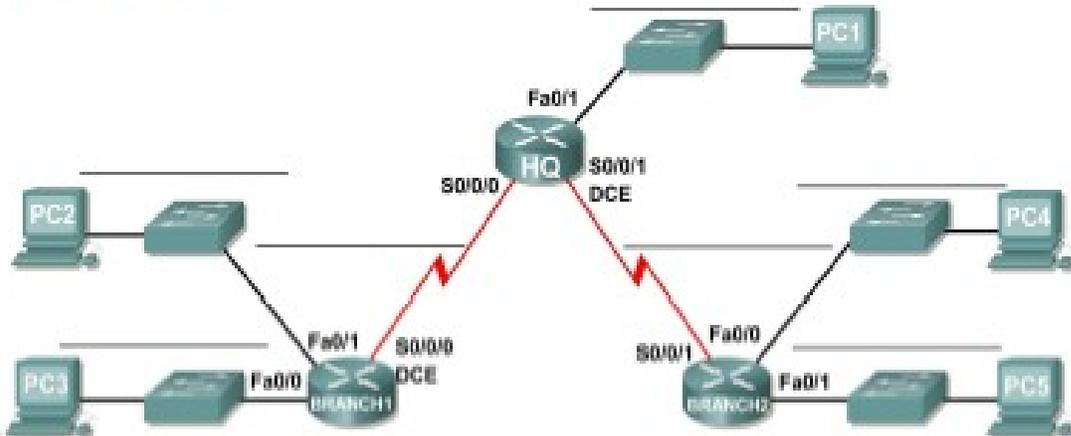
- Cable a network according to the Topology Diagram given by Lab Coordinator
- Erase the startup configuration and reload a router to the default state.
- Perform basic configuration tasks on a router.
- Interpret **debug ip routing** output.
- Configure and activate Serial and Ethernet interfaces.
- Test connectivity.
- Gather information to discover causes for lack of connectivity between devices.
- Configure a static route using an intermediate address.
- Configure a static route using an exit interface.
- Compare a static route with intermediate address to a static route with exit interface.
- Configure a default static route.
- Configure a summary static route.
- Document the network implementation.

5.0 Challenge Static Route Configuration

- Subnet an address space given requirements.
- Assign appropriate addresses to interfaces and document.
- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Perform basic configuration tasks on a router.
- Configure and activate Serial and Ethernet interfaces.
- Determine appropriate static, summary, and default routes.
- Test and verify configurations.
- Reflect upon and document the network implementation.

6.0 Subnetting Scenario 1

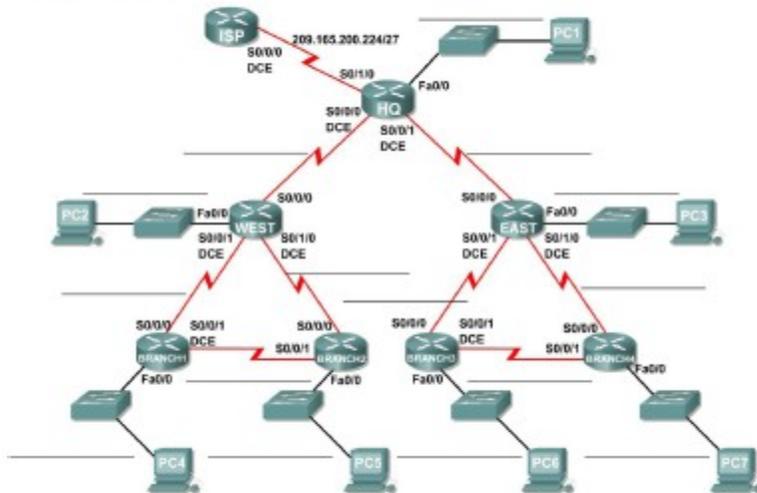
Topology Diagram



- Determine the number of subnets needed.
- Determine the number of hosts needed.
- Design an appropriate addressing scheme.
- Assign addresses and subnet mask pairs to device interfaces and hosts.
- Examine the use of the available network address space.
- Determine how static routing could be applied to the network.

7.0 Subnetting Scenario 2

Topology Diagram



- Determine the number of subnets needed.
- Determine the number of hosts needed.
- Design an appropriate addressing scheme.
- Assign addresses and subnet mask pairs to device interfaces and hosts.
- Examine the use of the available network address space.
- Determine how static routing could be applied to the network.

8.0 Routing Table Interpretation Lab

Given: The output from the HQ router

HQ#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E – EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o – ODR
P - periodic downloaded static route
Gateway of last resort is not set
10.0.0.0/30 is subnetted, 1 subnets
C 10.10.10.252 is directly connected, Serial0/0/0
172.16.0.0/30 is subnetted, 1 subnets
C 172.16.100.0 is directly connected, Serial0/0/1
R 192.168.1.0/24 [120/1] via 10.10.10.254, 00:00:03, Serial0/0/0
R 192.168.2.0/24 [120/1] via 10.10.10.254, 00:00:03, Serial0/0/0
R 192.168.3.0/24 [120/1] via 10.10.10.254, 00:00:03, Serial0/0/0
C 192.168.4.0/24 is directly connected, Loopback0
C 192.168.5.0/24 is directly connected, Loopback1
C 192.168.6.0/24 is directly connected, Loopback2
R 192.168.7.0/24 [120/1] via 172.16.100.2, 00:00:04, Serial0/0/1
R 192.168.8.0/24 [120/1] via 172.16.100.2, 00:00:04, Serial0/0/1
R 192.168.9.0/24 [120/1] via 172.16.100.2, 00:00:04, Serial0/0/1

Given: The output from the BRANCH1 router

BRANCH1#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B – BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E – EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o – ODR
P - periodic downloaded static route
Gateway of last resort is not set
10.0.0.0/30 is subnetted, 1 subnets
C 10.10.10.252 is directly connected, Serial0/0/0
R 172.16.0.0/16 [120/1] via 10.10.10.253, 00:00:04, Serial0/0/0
C 192.168.1.0/24 is directly connected, Loopback0
C 192.168.2.0/24 is directly connected, Loopback1
C 192.168.3.0/24 is directly connected, Loopback2
R 192.168.4.0/24 [120/1] via 10.10.10.253, 00:00:04, Serial0/0/0
R 192.168.5.0/24 [120/1] via 10.10.10.253, 00:00:04, Serial0/0/0
R 192.168.6.0/24 [120/1] via 10.10.10.253, 00:00:04, Serial0/0/0
R 192.168.7.0/24 [120/2] via 10.10.10.253, 00:00:04, Serial0/0/0
R 192.168.8.0/24 [120/2] via 10.10.10.253, 00:00:04, Serial0/0/0
R 192.168.9.0/24 [120/2] via 10.10.10.253, 00:00:04, Serial0/0/0

Given the output from the BRANCH2 router

BRANCH2#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B – BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E – EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o – ODR
P - periodic downloaded static route
Gateway of last resort is not set
R 10.0.0.0/8 [120/1] via 172.16.100.1, 00:00:19, Serial0/0/1
172.16.0.0/30 is subnetted, 1 subnets
C 172.16.100.0 is directly connected, Serial0/0/1
R 192.168.1.0/24 [120/2] via 172.16.100.1, 00:00:19, Serial0/0/1
R 192.168.2.0/24 [120/2] via 172.16.100.1, 00:00:19, Serial0/0/1
R 192.168.3.0/24 [120/2] via 172.16.100.1, 00:00:19, Serial0/0/1
R 192.168.4.0/24 [120/1] via 172.16.100.1, 00:00:19, Serial0/0/1
R 192.168.5.0/24 [120/1] via 172.16.100.1, 00:00:19, Serial0/0/1
R 192.168.6.0/24 [120/1] via 172.16.100.1, 00:00:19, Serial0/0/1

- C 192.168.7.0/24 is directly connected, Loopback0
- C 192.168.8.0/24 is directly connected, Loopback1
- C 192.168.9.0/24 is directly connected, Loopback2

Draw a diagram of the network based on your interpretation of the router outputs and do the following:

- Interpret router outputs.
- Identify the IP addresses for each router.
- Draw a diagram of the network topology.
- Cable and configure a network based on the topology diagram.
- Test and verify full connectivity.
- Reflect upon and document the network implementation.

9.0 Basic RIP Configuration

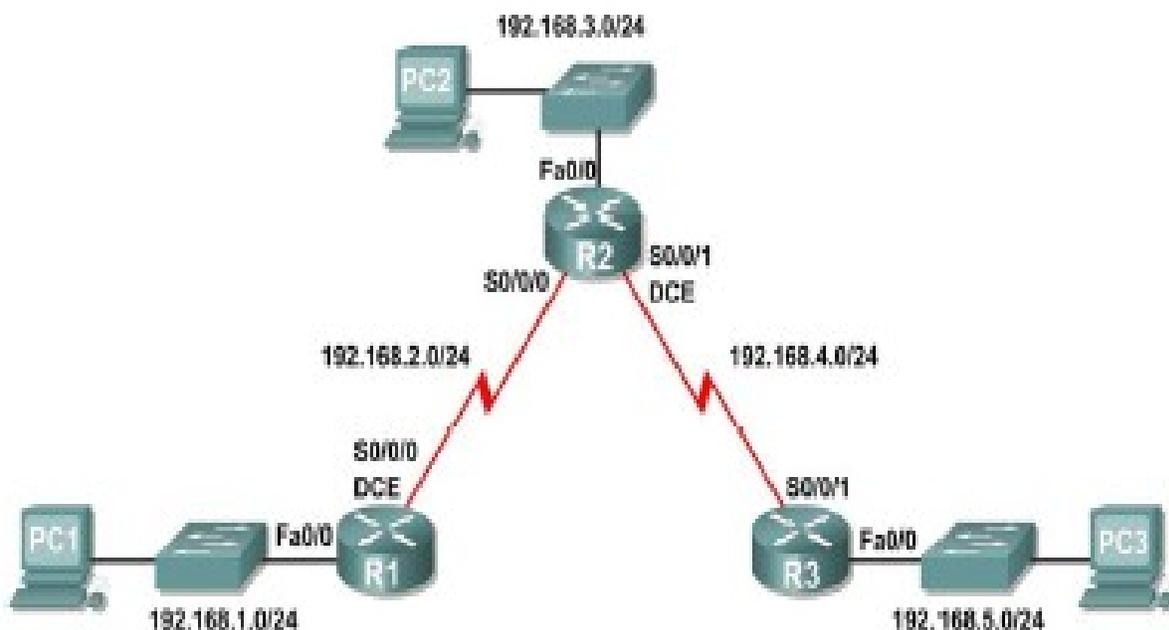
- Cable a network according to the Topology Diagram given below
- Erase the startup configuration and reload a router to the default state.
- Perform basic configuration tasks on a router.
- Configure and activate interfaces.
- Configure RIP routing on all routers.
- Verify RIP routing using **show** and **debug** commands.
- Reconfigure the network to make it contiguous.
- Observe automatic summarization at boundary router.
- Gather information about RIP processing using the **debug ip rip** command.
- Configure a static default route.
- Propagate default routes to RIP neighbors.
- Document the RIP configuration.

Scenarios

- Scenario A: Running RIPv1 on Classful Networks

Scenario A: Running RIPv1 on Classful Networks

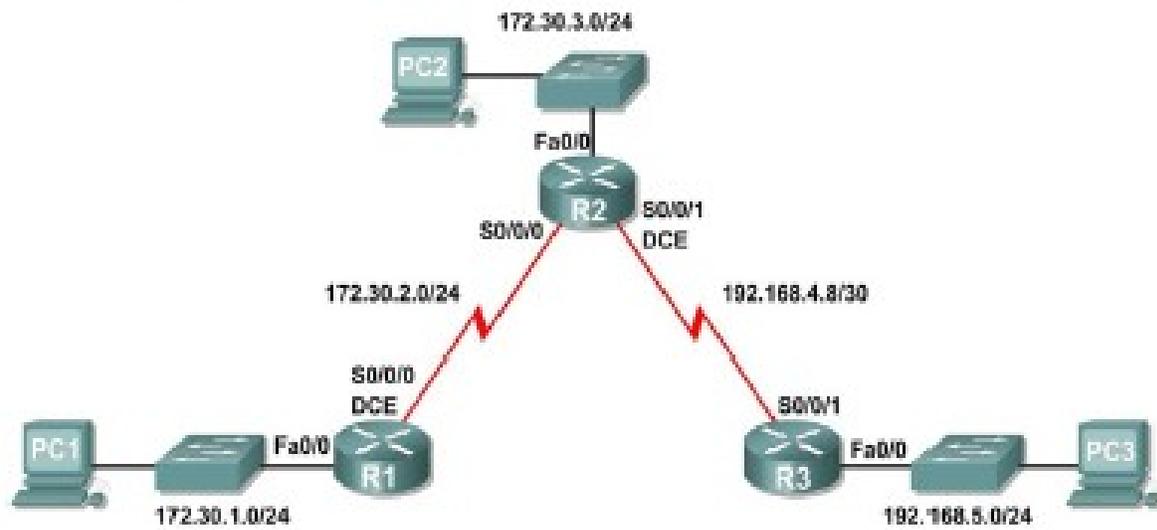
Topology Diagram



- Scenario B: Running RIPv1 with Subnets and Between Classful Networks

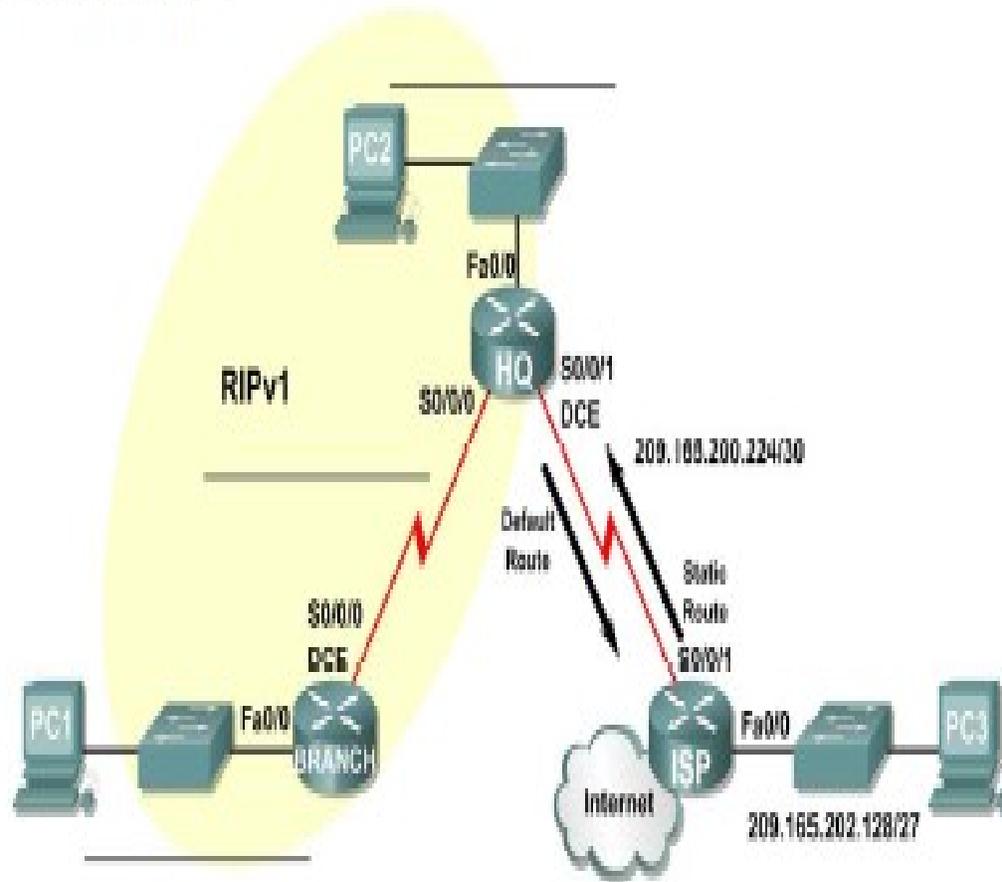
Scenario B: Running RIPv1 with Subnets and Between Classful Networks

Topology Diagram



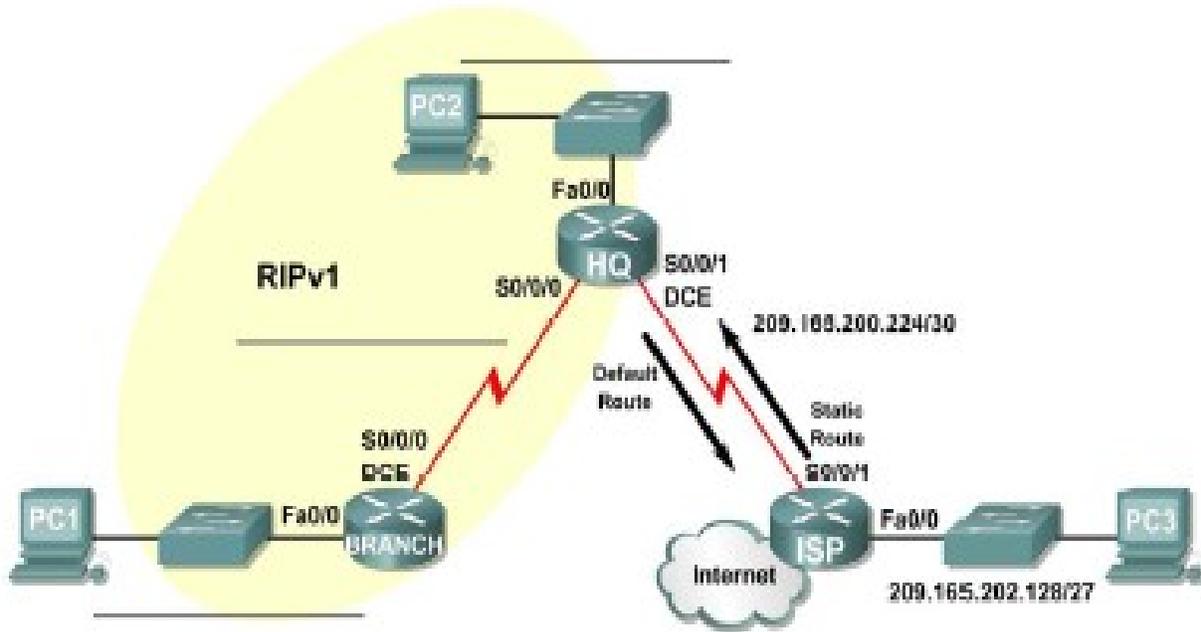
Scenario C: Running RIPv1 on a Stub Network

Topology Diagram



10.0 Challenge RIP Configuration

Topology Diagram

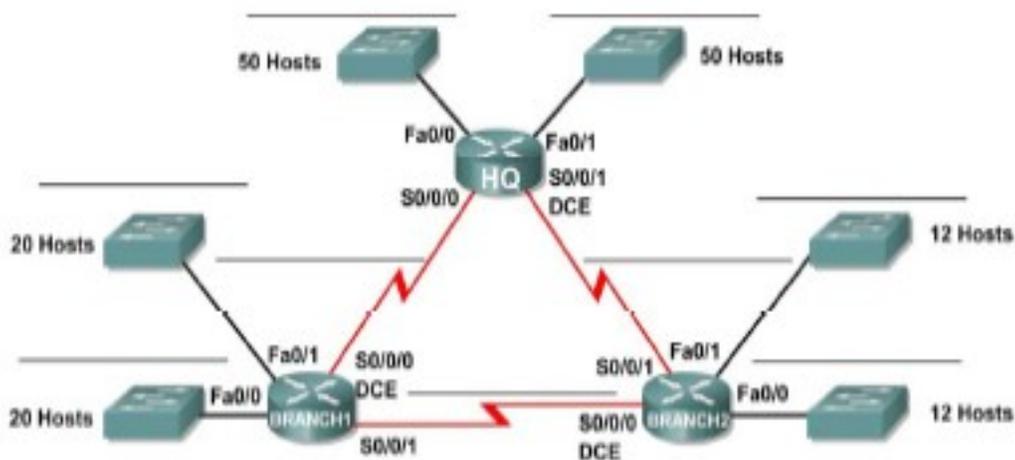


Subnet an address space given requirements.

- Assign appropriate addresses to interfaces and document them in the Addressing Table.
- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Configure RIPv1 routing on all routers.
- Configure and propagate a static default route.
- Verify RIPv1 operation.
- Test and verify full connectivity.
- Reflect upon and document the network implementation.

11.0 Basic VLSM Calculation and Addressing Design

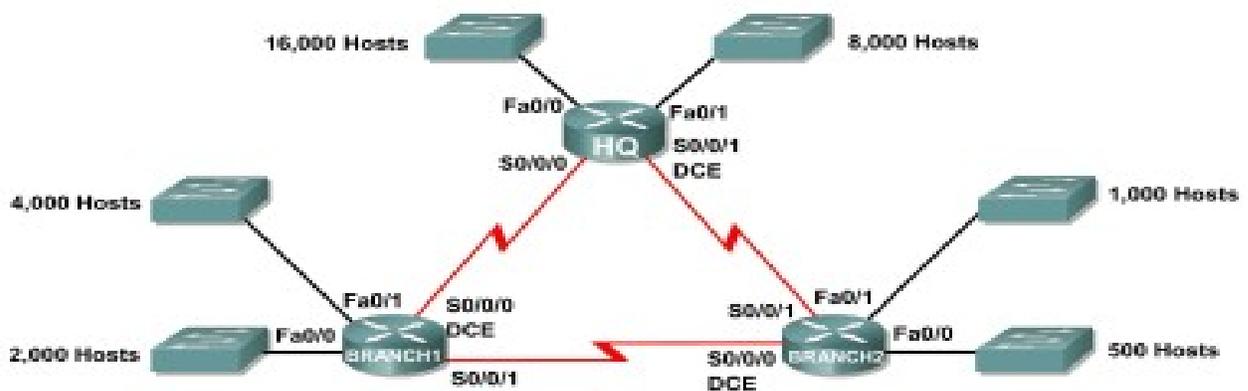
Topology Diagram



- Determine the number of subnets needed.
- Determine the number of hosts needed for each subnet
- Design an appropriate addressing scheme using VLSM.
- Assign addresses and subnet mask pairs to device interfaces.
- Examine the use of the available network address space.

12.0 Troubleshooting a VLSM Addressing Design

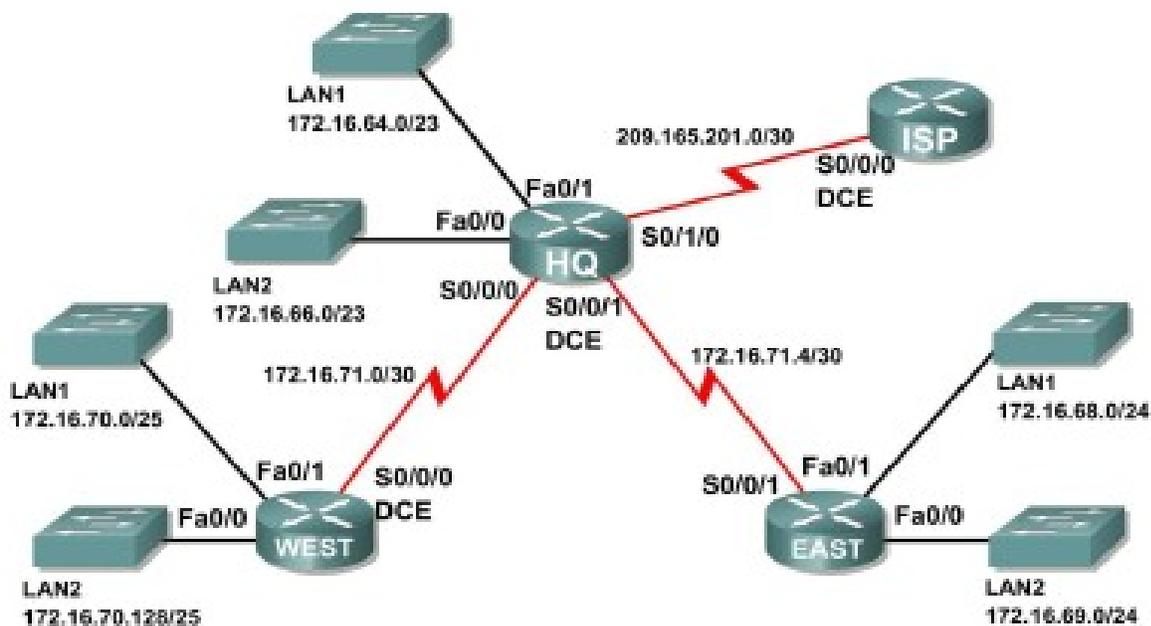
Topology Diagram



- Discover errors in a VLSM design.
- Propose solutions for VLSM design errors.
- Document the corrected VLSM assignments.

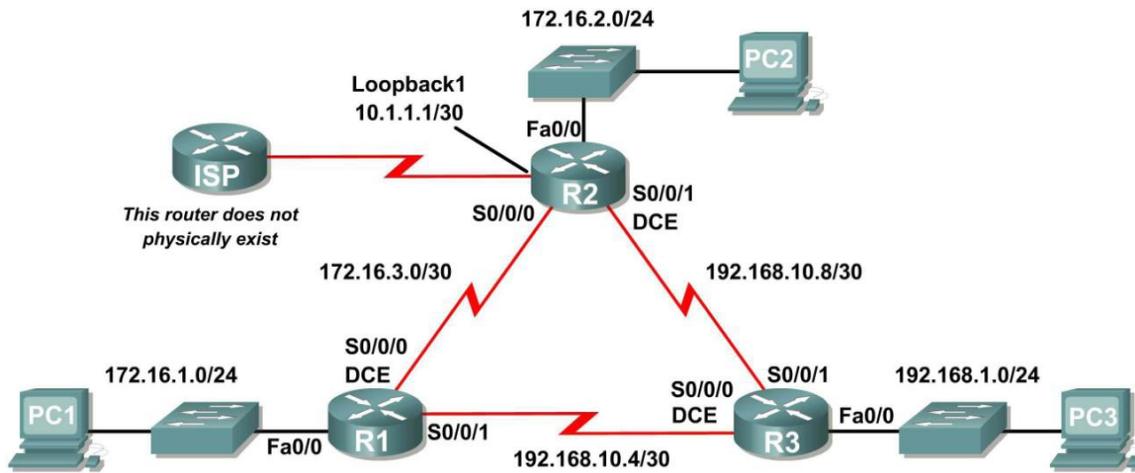
13.0 Basic Route Summarization

Topology Diagram



Determine summarized routes that can be used to reduce the size of routing tables

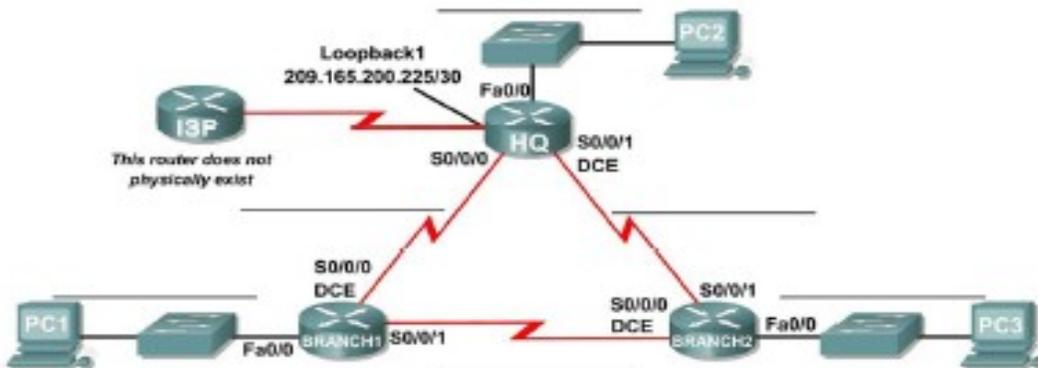
15.0 Basic EIGRP Configuration Lab



- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Perform basic configuration tasks on a router.
- Configure and activate interfaces.
- Configure EIGRP routing on all routers.
- Verify EIGRP routing using **show** commands.
- Disable automatic summarization.
- Configure manual summarization.
- Configure a static default route.
- Propagate default route to EIGRP neighbors.
- Document the EIGRP configuration.

16.0 Challenge EIGRP Configuration Lab

Topology Diagram

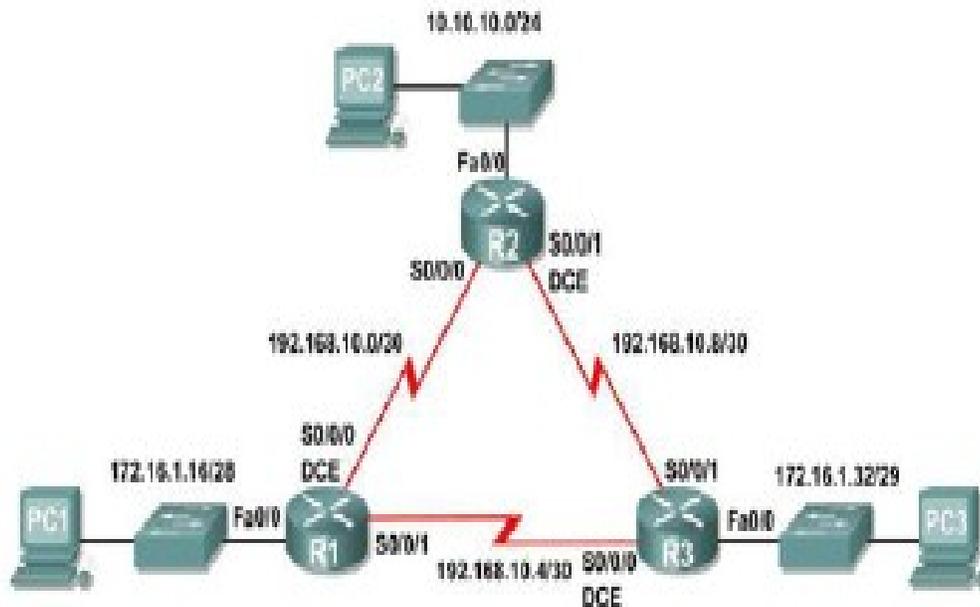


- Create an efficient VLSM design given requirements.
- Assign appropriate addresses to interfaces and document.
- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Configure routers including EIGRP.
- Configure and propagate a static default route.
- Verify EIGRP operation.
- Test and verify full connectivity.
- Reflect upon and document the network implementation.

17.0 Basic OSPF Configuration Lab

- Cable a network according to the Topology Diagram

Topology Diagram



-
- Erase the startup configuration and reload a router to the default state
- Perform basic configuration tasks on a router
- Configure and activate interfaces
- Configure OSPF routing on all routers
- Configure OSPF router IDs
- Verify OSPF routing using show commands
- Configure a static default route
- Propagate default route to OSPF neighbors
- Configure OSPF Hello and Dead Timers
- Configure OSPF on a multi-access network, priority and election process

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

GAME PROGRAMMING USING GREENFOOT LAB

Code	L	T	P/FW	CREDITS
MCA428	-	-	2	1

1. The first program: Little Crab
2. The Little Crab scenario
3. Making the crab move
4. Turning
5. Dealing with screen edges
6. Adding random behavior
7. Adding worms
8. Eating worms
9. Creating new methods
10. Adding a Lobster
11. Keyboard control
12. Adding sound
13. Adding objects automatically
14. Creating new objects
15. Animating images
16. Greenfoot images
17. Alternating the images
18. Counting worms
19. Sharing your scenarios
20. Exporting your scenario
21. Export to application
22. Export to a web page
23. Publishing on the Greenfoot Gallery
24. Making music: An on-screen piano
25. Animating the key
26. Producing the sound

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - IV

Code	L	T	P/FW	CREDITS
BCS411	1	-	-	1

Course Objective:

To facilitate the learner with Academic Language Proficiency and make them effective users of functional language to excel in their profession.

Course Contents:

Module I: Introduction to Speaking Skills

Business Conversation
Effective Public Speaking
Art of Persuasion

Module II: Speaking for Employment

Types of Interview
Styles of Interview
Facing Interviews-Fundamentals and Practice Session
Conducting Interviews- Fundamentals and Practice Session
Question Answer on Various Dimensions

Module III: Basic Telephony Skills

Guidelines for Making a Call
Guidelines for Answering a Call
Telephone Word Groups
Answering Systems and Voice-Mail

Module IV: Work Place Speaking

Team Briefing
Conflict Management
Negotiations
Participation in Meetings
Keynote Speeches

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.
- Taylor, Conversation in Practice.

BEHAVIOURAL SCIENCE – IV (PERSONAL AND PROFESSIONAL EXCELLENCE)

Code	L	T	P/FW	CREDITS
BSS411	1	-	-	1

Course Objective:

This course aims at imparting an understanding of:

- Build and leverage your professional reputation
- Maintain focus in pressure situations
- Make a balanced choice between professional and personal commitments

Course Contents:

Module I: Components of Excellence

- Personal Excellence:
 - Identifying long-term choices and goals
 - Uncovering the talent, strength & style
- Analyzing choke points in your personal processes by analysis in area of placements, events, seminars, conference, extracurricular activities, projects etc.
- Developing professional power: Goal-setting, time management, handling criticism, interruptions and time wasters

Module II: Professional Excellence

- Alan P. Rossiter's eight aspects of Professional Excellence
- Resilience during challenge and loss
- Continued Reflection (Placements, Events, Seminars, Conferences, Projects, Extracurricular Activities, etc.)

Module III: Career Planning

- Knowing one's Interest and Aptitude
- Identifying available Resources
- Setting goals to maintain focus:
- Developing Positive attributes in personality
- Self-reliance and Employability skills

Module IV: Professional Success

- Building independence & interdependence
- Reducing resistance to change
- Continued reflection (Placements, events, seminars, conferences, projects extracurricular Activities etc.)

Module V: Stress Management for Healthy Living

- Meaning and Nature of Stress
- Stages of stress
- Causes and Con
- equences of stress: Personal, Organizational and Environmental
- Personal Styles and strategies of coping

Module VI: End-of-Semester Appraisal

- Viva based on personal journal
- Assessment of Behavioural change as a result of training
- Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smith Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers
- Raman, A.T. (2003) Knowledge Management: A Resource Book. Excel Books, Delhi.
 - Kamalavijayan, D. (2005). Information and Knowledge Management. Macmillan India Ltd. Delhi

FRENCH – IV

Code	L	T	P/FW	CREDITS
FLF411	2	-	-	2

Course Objective:

To enable students:

- To develop strategies of comprehension of texts of different origin
- To present facts, projects, plans with precision

Course Contents:

Module C: pp. 104 – 139: Unités 8, 9

Contenu lexical: Unité 8: Découvrir le passé

1. parler du passé, des habitudes et des changements.
2. parler de la famille, raconter une suite d'événements/préciser leur date et leur durée.
3. connaître quelques moments de l'histoire

Unité 9: Entreprendre

1. faire un projet de la réalisation: (exprimer un besoin, préciser les étapes d'une réalisation)
2. parler d'une entreprise
3. parler du futur

Contenu grammatical:

1. Imparfait
2. Pronom « en »
3. Futur
4. Discours rapporté au présent
5. Passé récent
6. Présent progressif

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - IV

Code	L	T	P/FW	CREDITS
FLG411	2	-	-	2

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany.

Introduction to Advanced Grammar Language and Professional Jargon

Course Contents:

Module I: Present perfect tense

Present perfect tense, usage and applicability

Usage of this tense to indicate near past

Universal applicability of this tense in German

Module II: Letter writing

To acquaint the students with the form of writing informal letters.

Module III: Interchanging prepositions

Usage of prepositions with both accusative and dative cases

Usage of verbs fixed with prepositions

Emphasizing on the action and position factor

Module IV: Past tense

Introduction to simple past tense

Learning the verb forms in past tense

Making a list of all verbs in the past tense and the participle forms

Module V: Reading a Fairy Tale

Comprehension and narration

- Rotkäppchen
- Froschprinzessin
- Die Fremdsprache

Module VI: Genitive case

Genitive case – Explain the concept of possession in genitive

Mentioning the structure of weak nouns

Module VII: Genitive prepositions

Discuss the genitive prepositions and their usage: (während, wegen, statt, trotz)

Module VIII: Picture Description

Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;

Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch

- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - IV

Code	L	T	P/FW	CREDITS
FLS411	2	-	-	2

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I

Revision of earlier semester modules
Introduction to Present Continuous Tense (Gerunds)

Module II

Translation with Present Continuous Tense
Introduction to Gustar, Parecer, Apetecer, doler

Module III

Imperatives (positive and negative commands of regular verbs)

Module IV

Commercial/business vocabulary

Module V

Simple conversation with help of texts and vocabulary
En la recepcion del hotel
En el restaurante
En la agencia de viajes
En la tienda/supermercado

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras (Nivel – Elemental)

CHINESE – IV

Code	L	T	P/FW	CREDITS
FLC411	2	-	-	2

Course Objective:

How many characters are there? The early Qing dynasty dictionary included nearly 50,000 characters the vast majority of which were rare accumulated characters over the centuries. An educate person in China can probably recognize around 6000 characters. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Dialogue Practice
Observe picture and answer the question
Pronunciation and intonation
Character writing and stroke order.
Electronic items

Module II

Traveling – The Scenery is very beautiful
Weather and climate
Grammar question with – “bu shi Ma?”
The construction “yao ... le” (Used to indicate that an action is going to take place)
Time words “yiqian”, “yiwai” (Before and after).
The adverb “geng”.

Module III

Going to a friend house for a visit meeting his family and talking about their customs.
Fallen sick and going to the Doctor, the doctor examines, takes temperature and writes prescription.
Aspect particle “guo” shows that an action has happened some time in the past.
Progressive aspect of an actin “zhengzai” Also the use if “zhe” with it.
To welcome someone and to see off someone I cant go the airport to see you off... etc.

Module IV

Shipment. Is this the place to checking luggage?
Basic dialogue on – Where do u work?
Basic dialogue on – This is my address
Basic dialogue on – I understand Chinese
Basic dialogue on – What job do u do?
Basic dialogue on – What time is it now?

Module V

Basic dialogue on – What day (date) is it today?
Basic dialogue on – What is the weather like here.
Basic dialogue on – Do u like Chinese food?
Basic dialogue on – I am planning to go to China.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader, Part-2” Lesson 31-38

ARTIFICIAL INTELLIGENCE

Code	L	T	P/FW	CREDITS
MCA501	2	1	-	3

Course Objective:

The primary objective of this course is to provide an introduction to the basic principles, techniques, and applications of Artificial Intelligence. The emphasis of the course is on teaching the fundamentals and not on providing a mastery of specific commercially available software tools or programming environments. Upon successful completion of the course, you will have an understanding of the basic areas of artificial intelligence search, knowledge representation, learning and their applications in design and implementation of intelligent agents for a variety of tasks in analysis, design, and problem-solving. You will also be able to design and implement key components of intelligent agents of moderate complexity in Java and/or Lisp or Prolog and evaluate their performance.

Course Contents:

Module I: Introduction

AI and its importance, AI Problem, Application area.

Module II: Problem Representations

State space representation, problem-reduction representation, production system, production system characteristics, and types of production system.

Module III: Heuristic Search Techniques

AI and search process, brute force search, depth-first search, breadth-first search, time and space complexities, heuristics search, hill climbing, best first search, A* algorithm and beam search.

Module IV: Game Playing

AI and game playing, plausible move generator, static evaluation move generator, game playing strategies, problems in game playing.

Module V: Structured Knowledge

Associative networks, frame structures, conceptual dependencies and scripts.

Module VI: Logic

Propositional logic: syntax and semantics, First Order Predicate Logic (FOPL): Syntax and semantics, conversion to clausal form, inference rules, unification, and the resolution principles.

Module VII: Knowledge Acquisitions

Type of learning, Knowledge Acquisition, Early work in machine learning, learning by induction.

Module VIII: Expert System

Introduction to expert system, Phases of expert system, characteristics of expert system and a case study.

Module IX: Introduction to Neural Network, Fuzzy Logic, Robotics, LISP and Prolog.

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Artificial Intelligence – II Edition, Elaine Rich, Kevin Knight TMH.

References:

- Foundations of Artificial Intelligence and Expert Systems, V S Janakiraman, K Sarukesi, P Gopalakrishan, Macmillan India Ltd.
- Introduction to AI and Expert System, Dan W. Patterson, PHI.

INFORMATION STORAGE MANAGEMENT (EMC²)

Code	L	T	P/FW	CREDITS
MCA502	2	1	-	3

Course Objective:

The Course gives the much needed flexibility about the latest and emerging technologies to the students like SAN, NAS, SAN- FC, iSCSI etc.

Course Contents:

Module I: Storage Concepts

The Need for storage Networks, Storage Devices and Techniques, NAS and SAN, NAS Devices, Advantages and Disadvantages of NAS Devices, SANs, NAS Versus SANs, SAN Standard Organization

Module II: Introduction to DAS

Module III: Introduction to NAS

Module IV: Introduction to Storage Area Networks

Evolution and Benefits of SANs, SAN Components and Building Blocks, SAN Servers, SAN Storage, SAN Interfaces, SAN Interconnections, SAN Software, Data Access over SAN, Fiber Channel Basics: Overview of Fiber Channel Technology, Advantages of the Fiber Channel, Technology, Fiber Channel Ports, Fiber Channel Topology, Fiber Channel Layers, Classes of Service; Fiber Channel Products: HBAs, Fiber Channel Connectors, HUBs, Switches, Fiber Channel Switches Versus Hubs, Bridges, Routers, Storage Devices, Disk Arrays, JBOD, Tape Libraries and Subsystems, Storages Services; Fibre Channel Cabling: Copper-Based Cabling, Fiber-Optic Cabling, Fiber –Optic Connectors, Planning and Implementing Fiber-Optic Cables, Advantages of Fiber-Optic Cabling, Type of Fiber-Optic Cabling

Module V: SAN Topologies

Point –to-Point Topology, FC-AL Topology, Switched Fabric Topology; Designing and Building a SAN; SAN Design Considerations, Designing a SAN, SAN Best Practices; Implementing SAN Security: General Security Guidelines, Securing a SAN, Securing SAN Components, Software-Based Security Measures, Securing Business Environments; Problem Isolation and Management of SANs: Isolating and Troubleshooting Problems, Managing SANs, Disaster Management, Traditional Backup and Restoring, SAN Backup and Restoration, SAN Backup and Restoration Models; iSCSI Technology: Emergence of iSCSI Technology, iSCSI Concepts, iSCSI Design Considerations and Security Requirements, iSCSI –The Challenges; Future of SANs: The Need for Change, SAN Technology Development, OSN, IP SANs Storage Service Providers, Non-SAN Technologies, SoIP, NDMP, FCIP, iFCP, DAFS, VI, InfiniBand Architecture

Module VI: Disaster Recovery and Business Continuity

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Storage Area Network Fundamentals, Meeta Gupta, Cisco Press, Pearson Education

References:

- Network Security: The Complete Reference, Roberta Bragg, Mark Rhodes-Ousley, Keith Strassberg, et al - Tata McGraw-Hill presents

SUMMER PROJECT - II

Code	L	T	P/FW	CREDITS
MCA560	-	-	-	6

Guidelines:

There are certain phases of every Intern's professional development that cannot be effectively taught in the academic environment. These facets can only be learned through direct, on-the-job experience working with successful professionals and experts in the field. The internship program can best be described as an attempt to institutionalize efforts to bridge the gap between the professional world and the academic institutions. Entire effort in internship is in terms of extending the program of education and evaluation beyond the classroom of a university or institution. The educational process in the internship course seeks out and focuses attention on many latent attributes, which do not surface in the normal classroom situations. These attributes are intellectual ability, professional judgment and decision-making ability, inter-disciplinary approach, skills for data handling, ability in written and oral presentation, sense of responsibility etc.

In order to achieve these objectives, each student will maintain a file (**Internship File**). The Internship File aims to encourage students to keep a personal record of their learning and achievement throughout the Programme. It can be used as the basis for lifelong learning and for job applications. Items can be drawn from activities completed in the course modules and from the workplace to demonstrate learning and personal development.

The File will assess the student's analytical skills and ability to present supportive evidence, whilst demonstrating understanding of their organization, its needs and their own personal contribution to the organization.

The **layout guidelines** for the Project & Seminar Report

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page

Table of Content

Acknowledgement

Student Certificate

Company Profile (optional)

Introduction

Main Body

References / Bibliography

The File will include **five sections** in the order described below. The content and comprehensiveness of the main body and appendices of the report should include the following:

1. **The Title Page**--Title - An Internship Experience Report For (Your Name), name of internship organization, name of the Supervisor/Guide and his/her designation, date started and completed, and number of credits for which the report is submitted.
2. **Table of Content**--an outline of the contents by topics and subtopics with the page number and location of each section.
3. **Introduction**--short, but should include how and why you obtained the internship experience position and the relationship it has to your professional and career goals.
4. **Main Body**--should include but not be limited to daily tasks performed. Major projects contributed to, dates, hours on task, observations and feelings, meetings attended and their purposes, listing of tools and materials and their suppliers, and photographs if possible of projects, buildings and co-workers.
5. **References / Bibliography** --This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system

ASSESSMENT OF THE INTERNSHIP FILE

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Internship File. Each item in the SAR is ticked off when it is completed successfully. The faculty will also assess each item as it is completed. The SAR will be signed by the student and by the faculty to indicate that the File is the student's own work. It will also ensure regularity and meeting the delaines.

STUDENT ASSESSMENT RECORD (SAR)

1. Range of Research Methods used to obtain information

2. Execution of Research

3. Data Analysis

- Analyse Quantitative/ Qualitative information
- Control Quality

4. Draw Conclusions

Examination Scheme:

Components	V	S	R	FP
Weightage (%)	20	20	20	40

V – Viva, S – Synopsis, FP – Final Presentation, R - Report

MINOR PROJECT

Code	L	T	P/FW	CREDITS
MCA561	-	-	-	5

GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation.

Research is genuine exploration of the unknown that leads to new knowledge, which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page

Table of Contents

Acknowledgement

Student Certificate

Company Profile

Introduction

Chapters

Appendices

References / Bibliography

➤ Title or Cover Page or Front Page

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

➤ Table of Contents

Titles and subtitles are to correspond exactly with those in the text.

➤ Acknowledgement

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

➤ Student Certificate

Given by the Institute.

➤ Company Certificate & Profile

This is a certificate, which the company gives to the students. A Company Profile corresponds to a file with company-specific data. Company data can be stored there and included in a booking when needed.

➤ **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

➤ **Chapters**

All chapters and sections must be appropriately numbered, titled and should neither be too long nor too short in length.

The first chapter should be introductory in nature and should outline the background of the project, the problem

being solved, the importance, other related works and literature survey. The other chapters would form the body of

the report. The last chapter should be concluding in nature and should also discuss the future prospect of the project.

➤ **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

➤ **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The File should fulfill the following *assessment objectives*:

1. Writing a critical literature review
 - Search for literature
 - Summarizing and presenting the literature
 - Evaluating key content and theories
2. Collecting and analyzing research material
 - Choosing and designing research method
 - Conducting the research
 - Analyzing, sorting and classifying the data to make decision
3. Interpreting research method and draw conclusion
 - Findings
 - Recommendation
4. Assigning the theories and writing the project report
 - Structuring the project in accordance with the given style
5. Bibliography
 - This refer to the books, Journals and other documents consulting while working on the project

Examination Scheme:

Components	MRP	V	S	FP	R
Weightage (%)	20	20	20	20	20

MRP – Mid Report Presentation, V – Viva, S – Synopsis, FP – Final Presentation, R - Report

BIG DATA ANALYTICS

Code	L	T	P/FW	CREDITS
MCA510	2	1	-	3

COURSE OBJECTIVES:

- To explore the fundamental concepts of big data analytics
- To learn to analyze the big data using intelligent techniques.
- To understand the various search methods and visualization techniques.

Module I: INTRODUCTION TO BIG DATA

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

Module II: MINING DATA STREAMS

Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

Module III: HADOOP

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFSBasics- Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features

Module IV: HADOOP ENVIRONMENT

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks- Hadoop in the cloud

Module V: FRAMEWORKS

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphere BigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

- Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGrawHill Publishing, 2012
- Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, JohnWiley & sons, 2012.
- Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
- Paul Zikopoulos ,Dirk deRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corrigan , Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, 2012
- Zikopoulos, Paul, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, 2011

ACCESSING THE WAN

Code	L	T	P/FW	CREDITS
MCA511	2	1	-	3

Course Objective:

The course focuses on advanced IP addressing techniques Variable Length Subnet Masking (VLSM), advanced IP addressing technique (Network Address Translation and terminology, PPP, ISDN, DDR, Frame Relay, network security, ACLs, Teleworker services and network troubleshooting, In addition the student will prepare for taking the CCNA Exam.

Course Contents:

Module I: Introduction to WAN

Providing Integrated Services to Enterprise, WAN Technology Concept, WAN Connection Option

Module II: PPP

Serial Point to Point Links, PPP Concept, Configuring PPP, Configuring PPP with Authentication.

Module III: Frame Relay

Basic Frame Relay Concepts, Configuring Frame Relay, Advanced Frame Relay Concept, Configuring Advanced Frame Relay Concept

Module IV: Network Security

Introduction to Network Security, Securing Cisco Routers, Secure Router Network Services, Using Cisco SDM, Secure Router Management

Module V: ACLs

Using ACL to Secure Network, Configuring Standard ACLs, Configuring Extended ACLs, Configuring Complex ACLs

Module VI: Teleworker Services

Business Requirement for Teleworker Services, Broadband Services, VPN Technology

Module VII: IP addressing Services

DHCP, Scaling Network with NAT, Ipv6

Module VIII: Network Troubleshooting

Establishing Network Performance Base Line, Troubleshooting Methodology and Tools, Common WAN Implementation Issues, Network Troubleshooting

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text

- Cisco Networking Academy Programme CCNA 4 Companion Guide, 3rd Edn by Pearson Education.
- Cisco Networking Academy Programme CCNA 4 Lab Companion, 3rd Edn by Pearson Education.
- CISCO CCNA-Exploration 4.0, Module 4, Pearson Education.

References:

- Cisco Networking Academy Programme CCNA 4 Engineering General, 3rd Edn by Pearson Education

Note: This is an online course of Cisco. Online materials provided by Cisco are studied.

CLOUD COMPUTING

Code	L	T	P/FW	CREDITS
MCA512	2	1	-	3

Course Objective

- To understand the concept of Virtualization and design of cloud Services
- To introduce the broad perspective of cloud architecture and model
- To learn to design the trusted cloud Computing system
- To apply different cloud programming model as per need.
- To understand the features of cloud simulator
- To be familiar with the lead players in cloud.

Course Contents

MODULE I: CLOUD ARCHITECTURE AND MODEL

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

MODULE II: VIRTUALIZATION

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

MODULE III: CLOUD INFRASTRUCTURE

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

MODULE IV: PROGRAMMING MODEL

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

MODULE V: SECURITY IN THE CLOUD

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

Examination Scheme:

Components	CT	A/C/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

- John W.Rittinghouse and James F.Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.
- Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”, TMH, 2009.
- Kumar Saurabh, “Cloud Computing – insights into New-Era Infrastructure”, Wiley India,2011.
- James E. Smith, Ravi Nair, “Virtual Machines: Versatile Platforms for Systems and Processes”, Elsevier/Morgan Kaufmann, 2005.
- Ronald L. Krutz, Russell Dean Vines, “Cloud Security – A comprehensive Guide to Secure Cloud Computing”, Wiley – India, 2010.

PHP

Code	L	T	P/FW	CREDITS
MCA513	2	1	-	3

Course Objective:

- Write basic PHP scripts that process user input from a web form.
- Use PHP variables, arrays, loops, conditional statements, and operators.
- Create and incorporate PHP functions.
- Integrate PHP scripts with email

Course Contents:

Module I: Introduction to PHP Servers :Introducing Apache, PHP, MySql, Installing Apache, PHP, MySql, Configuring Apache for PHP, Registering Domains, Parking Web sites, Publishing with FTP

Introduction to PHP :Introduction to PHP, Install, Syntax, Common PHP Script Elements, Variables, String, Operators, If...Else, Switch, Arrays, Looping, Functions, Forms, \$_GET, \$_POST, Date, Include, Error, Exception, Filter, PHP ODBC, Working With Forms, Processing Forms, Form Validation, Addressing the Stateless Nature of HTTP, Hidden Form Fields, Accessing Databases With PHP, Interacting With Databases, Modifying Database Records Using PHP

Module II: Generating dynamic content :Identifying browser platform, Server date and time, Time specific content, Random number generator, Getting form values, Displaying submitted values, String manipulation, Reloading a page, Browser redirection

Module III: Advance PHP :MySQL Connect, MySQL Create, MySQL Insert, MySQL Select, MySQL Where, MySQL Order By, MySQL Update, MySQL Delete, Introducing cookies, Set a cookie, Access limitation, Introducing sessions, Starting session, Session without cookies, Setting session persistence, Cookies or session, Sending plain text E-mail, Sending html E-mail, Creating an attachment form, Sending attachment with E-mail

Module IV: File Handling :File and Directory Handling, Including Files, File Access, Displaying directory files, Coping and renaming files, Deleting files, Opening and closing files, Reading files, Writing files, Logging visitor details, Enabling file uploads, Creating and upload form, Creating an upload script, Uploading a file

Module V: PHP and My SQL:Introducing databases, Exploring database tables, Creating new database, Creating database table, SQL data types, Inserting table data, Altering an existing table, Updating records, Deleting data, tables and databases, SQL Queries, Creating Mysql user and password, Connecting a user to Mysql, Listing databases, Listing table names, Creating a database, Deleting a database, Creating a database table, Inserting table data, Altering tables, Retrieving data from a table

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

Atkinson, Leon. *Core PHP Programming, 2nd Edition*. New York: Prentice Hall

References:

- <http://www.zend.com>
- <http://www.php.net>
- <http://www.mysql.com>
- <http://www.phpbuilder.com>
- <http://www.useit.com>
- <http://www.devshed.com>
- <http://www.webmonkey.com>

Post RDBMS with CACHE

Code	L	T	P/FW	CREDITS
MCA514	2	1	-	3

Course Objective:

The course objective is to learn the latest and emerging technologies 'Cache' in the Information Technology Field. Here students will learn the new database technology that is object oriented database technology (Post Relational DBMS).

Course Contents:

Module I: Introduction to Cache Objects

Objectives of classes, Typographic Conventions, Requirements, Namespace, Datasets, Creating a Namespace, Cache Cube, Creation and formatting of physical file.

Module II: Working with class

How to make a class, specification of class, Changing Namespace, Introduction to Property, Adding property.

Module III: Query and Index Handling

Introduction to query, How to create a query, Creating an Index, compilation, How to access data using Cache Object Script, Viewing the database, Introduction to OpenID, Save, write methods, Storing data in the global.

Module IV: Populating a class

Generating random data for the class, Searching the databases, Embedded Objects, Introduction to searching the database using query, populating an Index, Testing a Query, Embedded and Serial Object, Validations.

Module V: References, Working with Pre-defined Values

Introduction to Reference Object, how to work with Pre-defined values, Calculating the fields when the record is updated, Storing a picture, Creating List, Working with Arrays, Introduction to collections, Formatting data for output, Making Relationship.

Module VI: Cache with Visual Basic

VB Form Wizard, Cache Object Server, Project, Connecting to Cache, Working with Combo-box, Searching the database, Using embedded objects, References, Updating the database, Multimedia-Photos, Formatting data for Output, Making Relationship.

Module VII: Cache Server Pages

Introduction to CSP, Configuring CSP, Writing code in CSP, Introduction to ZEN, Configuring ZEN, Working with ZEN.

Case Studies: OPTALERT, DTI, ECOVISION, CBT, AUSTIN

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

- From website: www.Intersystems.com/cache

SOFTWARE TESTING & QUALITY ASSURANCE

Code	L	T	P/FW	CREDITS
MCA515	2	1	-	3

COURSE OBJECTIVES:

- To know the behavior of the testing techniques to detect the errors in the software
- To understand standard principles to check the occurrence of defects and its removal.
- To learn the functionality of automated testing tools
- To understand the models of software reliability.

Course Contents

Module I: TESTING ENVIRONMENT AND TEST PROCESSES 9

World-Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing – Analyzing and Reporting Test Results – Acceptance Testing – Operational Testing – Post Implementation Analysis

Module II: TESTING TECHNIQUES AND LEVELS OF TESTING 9

Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing - Unit Testing - Integration Testing - Defect Bash Elimination. System Testing - Usability and Accessibility Testing – Configuration Testing - Compatibility Testing - Case study for White box testing and Black box testing techniques.

Module III: INCORPORATING SPECIALIZED TESTING RESPONSIBILITIES 9

Testing Client/Server Systems – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Object-Oriented Software – Object Oriented Testing – Testing Web based systems – Web based system – Web Technology Evolution – Traditional Software and Web based Software – Challenges in Testing for Web-based Software – Testing a Data Warehouse - Case Study for Web Application Testing.

Module IV: TEST AUTOMATION 9

Selecting and Installing Software Testing Tools - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug – Debugging – Case study using Bug Tracking Tool.

Module V: SOFTWARE TESTING AND QUALITY METRICS 9

Testing Software System Security - Six-Sigma – TQM - Complexity Metrics and Models – Quality Management Metrics - Availability Metrics - Defect Removal Effectiveness - FMEA - Quality Function Deployment – Taguchi Quality Loss Function – Cost of Quality. Case Study for Complexity and Object Oriented Metrics.

Examination Scheme:

Components	CT1	A/C/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

- William Perry, “Effective Methods of Software Testing”, Third Edition, Wiley Publishing 2007
- Srinivasan Desikan and Gopaldaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2007.
- Dale H. Besterfield et al., “Total Quality Management”, Pearson Education Asia, Third Edition, Indian Reprint (2006).
- Stephen Kan, “Metrics and Models in Software Quality”, Addison – Wesley, Second Edition, 2004.
- Renu Rajani, Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2004.
- Edward Kit, “ Software Testing in the Real World – Improving the Process”, Pearson Education, 1995.
- Adithya P. Mathur, “ Foundations of Software Testing – Fundamentals algorithms and techniques”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

• DIGITAL IMAGE PROCESSING

Code	L	T	P/FW	CREDITS
MCA530	2	1	-	3

Course Objective:

Processing color and grayscale images or other two-dimensional signals has become an important tool for research and investigation in many areas of science and engineering. Digital Image Processing is designed to give professionals and students a powerful collection of fundamental and advanced image processing tools on the desktop. Digital Image Processing takes full advantage of the computational technology of Mathematica.

Course Contents:

Module I: Introduction and Digital Image Fundamentals

The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbours, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

Module II: Image Enhancement in the Spatial Domain

Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothing and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

Module III: Image Enhancement in the Frequency Domain:

Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.

Image Restoration: A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear Position-Invariant Degrations, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

Module IV: Image Compression

Coding, Interpixel and Psychovisual Redundancy, Image Compression models, Elements of Information Theory, Error free comparison, Lossy compression, Image compression standards.

Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Threshold, Region Oriented Segmentation, Motion based segmentation.

Module V: Representation and Description

Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

Object Recognition: Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods

Text & References:

Text:

- Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 2nd edition, Pearson Education.
- K. Jain, "Fundamental of Digital Image Processing", PHI.

References:

- Rosefield Kak, "Digital Picture Processing",
- W.K. Pratt, "Digital Image Processing",

DREAMWEAVER

Code	L	T	P/FW	CREDITS
MCA531	2	1	-	3

Course Objective:

- Have hands-on knowledge in developing simple and comprehensive Internet Web sites.
- Be able to plan, design, and develop Web sites.
- Acquire creative skills in design, layout, and interactivity of Web pages.
- Integrate varied software applications such as Web editor, graphic, and multimedia software.
- Create a portfolio of Web sites that demonstrate competency in the software application.
- Understand fundamental trends of technological evolution of Web development.

Course Contents:

Module I: Concept of Web Designing

Basic concepts of Web designing, what is a website, features of a website, efficient and effective web designing, constraints of web designing, limitations of a website, defining a web page

Module II: Working with Dreamweaver

Explore the Dreamweaver working environment, creating a web page, format of a web page, organizing files and folders, create templates, insert images and tables, Create repeating region templates, Create hyperlinks, Create e-mail links, Create image maps, Create anchors, Create framesets, Enhance frames in a frameset, Ensure accessibility, Upload files onto a site

Module III: Developing Professional Webpage

Use coding tools, Search for and replace code, Add design notes and comments, Create and apply CSS styles, Apply external styles to multiple Web pages, Redefine style sheets, Create rollovers, Create a navigation bar, Create Flash buttons and Flash text, Use Spry user interface widgets, Add Spry effects, Create AP elements, Control AP elements dynamically, Insert rich media objects in an AP element on a page, Add library items from site pages, Place library items onto a Web page, Use snippets to perform repetitive tasks, Replay actions using the History panel, Set up forms in Dreamweaver, Add form elements, Validate a form, Integrate XML-based data
Display XML data by using Spry

Module IV: Using Advance Features for Development

Connect to a server by using server technologies, Identify the components of a database-driven site, Create a connection to a database, Create record-sets, Display records, Page through record-sets, Create master and detail pages, Create search and result pages, Use dynamic form elements, Insert records, Edit records, Delete records, Create a user registration form, Secure web pages, Transfer files to servers, Manage websites

Examination Scheme:

Components	CT	HA/V/Q	Attd	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Adobe Dreamweaver CS5 Classroom in a Book by Adobe Creative Team, Published by: Adobe Press

References:

- Adobe Dreamweaver CS5, Digital Classroom (W/Cd), J. Osborn

ORACLE

Code	L	T	P/FW	CREDITS
MCA532	2	1	-	3

Course Objective:

This course provides the learners with the essential SQL skills of querying the database, the meta data and creating database and managing database..

Course Contents:

Module I:

Introduction to RDBMS, Oracle and Client Server Computing, Oracle Architecture, Oracle files, Installation of Oracle.

SQL : Data Types, Writing queries, DDL, DML, DCL

PL-SQL: Basics of PL-SQL, Procedure, Function, Packages, Cursors, Triggers, Exception Handling

Module II:

Creating and Managing Database : Data Dictionary, Redo Log, Control Files, Data Dictionary Views.

Module III:

Managing Disk Space: ROWID, Rollback Segment, Creating and Managing Tablespace

Module IV:

Backup and Recovery: Types of Backup(Control file backup, Redo log backup, cold backup and Hot backup), Types of Failures, Recovery Methods

Module V:

Database Security : Authentication, Object VS System Security, defining database roles.

Import and Export, Performance Tuning, Locking

Examination Scheme:

Components	CT	HA/V/Q	ATTD.	EE
Weightage (%)	15	10	5	70

Text & References:

Text:

- Oracle 10g The Complete Reference, Oracle Press

References:

- Database System Concepts, Korth & Sudarshan, TMH
- Oracle DBA Fundamentals , Oracle Press.

LAN SWITCHING AND WIRELESS

Code	L	T	P/FW	CREDITS
MCA533	2	1	-	3

Course Objective:

The course focuses on advanced IP addressing techniques Variable Length Subnet Masking (VLSM), intermediate routing protocols (RIP v2, single area OSPF, EIGRP). Command line interface configuration of switches, Ethernet switching, Virtual LANs (VLANs), Spanning Tree Protocol (STP) and VLAN Trunking Protocol (VTP),. In addition the student will prepare for taking the CCNA Exam.

Course Contents:

Module I: LAN Design

Switched LAN Architecture, Principles of Hierarchical Network Design, Matching Switches to Specific LAN Function

Module II: Basic Switch Concepts and Configuration

Introduction to Ethernet/ 802.3 LAN, Forward Frame Using a Switch, Switch Management Configuration, Configuring Switch Security,

Module III: VLANs

Introducing VLAN, VLAN Trunking, Configuring VLAN and Trunks', Trouble Shooting VLANs and Trunks

Module IV: VTP

VTP Concept, VTP Operation, Configure VTP

Module V: STP

Redundant Layer 2 Topology, Introduction To STP, STP Convergence, PVSTP+, RSTP And Paired PVSTP+

Module VI: Inter-VLAN Routing

Inter- VLAN Routing, Configuring Inter-VLAN Routing, Trouble Shooting Inter-VLAN Routing

Module VII: Basic Wireless Concepts and Configuration

The Wireless LAN, Wireless LAN Security, Configuring Wireless LAN Access, Trouble Shooting Simple WLAN Problems

Examination Scheme:

Components	CT	HA/V/Q	Attnd	EE
Weightage (%)	15	10	5	70

Text & References:

Text

- Cisco Networking Academy Programme CCNA 3 Companion Guide, 3rd Edn by Pearson Education.
- Cisco Networking Academy Programme CCNA 3 Lab Companion, 3rd Edn by Pearson Education.
- CISCO CCNA-Exploration 4.0, Module 3, Pearson Education.

References:

- Cisco Networking Academy Programme CCNA 3 Engineering General, 3rd Edn by Pearson Education

Note: This is an online course of Cisco. Online materials provided by Cisco are studied

ANDROID PROGRAMMING

Code	L	T	P/FW	CREDITS
MCA534	2	1	-	3

Course Objectives

This course introduces mobile application development for the Android platform. Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. Students will learn skills for creating and deploying Android applications, with particular emphasis on software engineering topics including software architecture, software process, usability, and deployment

Course Contents

Module –I: Basics of Android

What is Android, History and Version, Installing softwares , Setup Eclipse, Hello Android example, Internal Details, Dalvik VM , Software Stack , Android Core Building Blocks , Android Emulator , AndroidManifest.xml , R.java file , Hide Title Bar , Screen Orientation

Module –II: UI Widgets

Working with Button, Toast, Custom Toast, Button, Toggle Button, Switch Button, Image Button, CheckBox, AlertDialog, Spinner, AutoCompleteTextView, RatingBar, DatePicker, TimePicker, ProgressBar, Quick Contact Budge, Analog Clock and Digital Clock, Working with hardware Button, File Download,

Module –III: Activity, Intent & Fragment

Activity Lifecycle, Activity Example, Implicit Intent, Explicit Intent, Fragment Lifecycle, Fragment Example, Dynamic Fragment,

Module –IV: Android Menu & Layout Manager

Option Menu, Context Menu, Popup Menu , Relative Layout, Linear Layout, Table Layout, Grid Layout

Module –V: Adaptor & Views

Array Adaptor, ArrayList Adaptor, Base Adaptor, GridView , WebView , ScrollView , SearchView , TabHost , DynamicListView , ExpandedListView

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & Reference:

- Android Programming: The Big Nerd Ranch Guide (Big Nerd Ranch Guides) (By: Bill Philips & Brian Hardy)
- Android Recipes: A Problem-Solution Approach, Dave Smith & Jeff Friesen

DIGITAL IMAGE PROCESSING LAB

Code	L	T	P/FW	CREDITS
MCA520	-	-	2	1

Software Required: Java

List of Assignments:

Experiments will be based on Image Representation, Image transformation, Image Enhancements, Edge Detection, Morphological Image processing and Segmentation.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

DREAM WEAVER LAB

Code	L	T	P/FW	CREDITS
MCA521	-	-	2	1

List of Programs:

1. Create a web page to show the working of Heading Tags, Font Tag, Paragraph Tag, Font Style Tag, Pre Tag, and other common tags.
2. Create a web page to show implementation of images and image map.
3. Create a web page to show implementation of hyperlink, bookmark, and email link.
4. Create a web page to show implementation of tables.
5. Create a web page to show implementation of frames.
6. Create a web page to show implementation of inline, internal and external CSS.
7. Create a web page to show implementation of rollovers, image viewer, navigation bar, flash button, and flash text.
8. Create a web page to show implementation of Spry User Interface widgets (Menu, Accordion, Tab Panel, etc.).
9. Create a web page to show implementation of spry effects on text, images, etc.
10. Create a web page to show implementation of AP (Absolute Positioning) elements.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ORACLE LAB

Code	L	T	P/FW	CREDITS
MCA522	-	-	2	1

List of Programs:

The experiments will be based on the topics covered in the corresponding theory Course.

Remember to: SET SERVEROUTPUT ON. Also, the code examples below use the LECT tables. So, if you have used the My_ prefix on your tables, use them.

Task 1: a first cursor

The code below is designed to print out the salaries over 30000 for all personnel. You can type this code in directly if you wish or copy and paste it. What we want you to do is look at the output you get and be able to describe what each line of code is doing.

```
DECLARE
    CURSOR high_salaries IS SELECT snum, surname, salary FROM personnel where salary > 30000;
v_snum          personnel.snum%TYPE;
v_surname       personnel.surname%TYPE;
v_salary        personnel.salary%TYPE;
BEGIN
    OPEN high_salaries;
    LOOP
        FETCH high_salaries INTO v_snum, v_surname, v_salary;
        EXIT when high_salaries%NOTFOUND;
        DBMS_OUTPUT.PUT_LINE(v_snum || ' ' || v_surname || ' ' || v_salary);
    END LOOP;
    CLOSE high_salaries;
END;
```

Write your brief notes about the code here:

Task 2: a cursor with errors

- a) The cursor code below is designed to update personnel salaries based on where they work. Only there are lots of errors in it for you to sort out. Good luck, look very, very carefully and try to learn by interpreting the error messages you get. Sometimes they ARE useful! If you don't get it all sorted right away you can always come back to it. Go onto the next question if you get stuck as you can persevere with this in your own time.

```
declare
cursor c1 select snum, city from personnel p, branch b where p.div=b.div;
v_city    b.city%type ;
v_snum    personnel.snum%type;
```

```

v_salary_1    number=30000;
v_salary_2    number(4):=25000;
v_salary_3    number:=20000;
v_salary      personnel.salary%type;
begin
  open c1;
  loop
    fetch c1 into v_snum, v_city;
    exit where c1%NOTFOUND;
    If v_city='LONDON' then v_salary:=v_salary1;
    elsif v_city='BRISTOL' then v_salary:=v_salary_2;
    else v_sal:=v_salary_3;
    end if;
    update my_personnel set salary = v_salary where snum=v_snum;
  endloop;
  close ;
end;

```

Task 3: Storing and Executing PL/SQL

In order to store PL/SQL, simply replace the DECLARE word with:

CREATE PROCEDURE average_salary IS

A block which outputs the average result and current date and user is given below.

```

DECLARE
average NUMBER(7,2);
Begin
SELECT AVG(salary) INTO average FROM personnel;
DBMS_OUTPUT.PUT_LINE ('As of ' || SYSDATE);
DBMS_OUTPUT.PUT_LINE ('The average salary is ' || Average);
DBMS_OUTPUT.PUT_LINE ('Prepared by ' || USER);
END;

```

- Edit and store this code now as a procedure.
- Run it.

If you've got that, congratulations, you've stored a PL/SQL procedure.

- If you still have compilation errors, check everything very carefully especially spelling and punctuation! Also try the command SHOW ERRORS for an idea of what went wrong.
- Now execute the procedure

Task 4: Changing a stored procedure

Say you now want to get the average salary just for branch 10.
The code you need is

```

CREATE PROCEDURE average_salary IS
Today DATE := SYSDATE;
Average NUMBER(7,2);
Begin
SELECT AVG(salary) INTO Average FROM personnel WHERE div=10;
DBMS_OUTPUT.PUT_LINE ('As of ' || Today);
DBMS_OUTPUT.PUT_LINE ('Average salary for branch 10 is ' || Average);
DBMS_OUTPUT.PUT_LINE ('Prepared by ' || USER);

```

END;

- Do the CREATE PROCEDURE process again, adding the WHERE clause as shown above.
- You will probably get the message
" ERROR at line 1: ORA-00955: name is already used by an existing object"
Why?

.....

To solve this problem, you could DROP the procedure first. But there is a better way:

- Use
CREATE **OR REPLACE** PROCEDURE
at the top and try again.

That should have worked.

Note: The words OR REPLACE after CREATE make sure that if the procedure exists already, you can edit it.

Task 5: Procedure with parameter

So we know how to change the stored procedure. What would you do if you want the average for another branch? It's tedious to change the stored procedure every time we want different values. It would be so much nicer to be able to just specify the branch code when we execute the procedure.

The solution to this is to use **input parameters**. This can be done quite easily, you only need a few changes to the block. They are highlighted in bold below (note how the output is also changed):

```
CREATE OR REPLACE PROCEDURE average_salary(branchID CHAR) IS
Today DATE := SYSDATE;
Average NUMBER(7,2);
Begin
  SELECT AVG(salary) INTO Average FROM Personnel WHERE div=branchID;
  DBMS_OUTPUT.PUT_LINE ('As of ' || Today);
  DBMS_OUTPUT.PUT_LINE ('The average for branch ' || branchID || ' is ' || Average);
  DBMS_OUTPUT.PUT_LINE ('Prepared by ' || USER);
END;
```

CHAR is the data type
matching VARCHAR2

- Create this procedure now and execute it.
- Run the procedure twice, inserting different values each time.

Task 6: Declaring Procedures within procedures and calling them

Study the code below and write down the output you would expect the program to produce, then execute the main procedure and see if you were right. You'll need to understand the MOD function in particular. Basically it returns a zero if the result of a division by a specified number is an integer. Be clear about how the control is being passed to and fro between the procedures

```
create or replace procedure main_proc
is
  v_test number:=4;
procedure inner_proc1
is
begin
  dbms_output.put_line(v_test||' inner procedure one');
end inner_proc1;
procedure inner_proc2
is
begin
```

```

        dbms_output.put_line(v_test||' inner procedure two');
    end inner_proc2;
begin
    while v_test <=10 loop
        inner_proc1;
        if mod(v_test,2)=0 then
            inner_proc2;
        end if;
        v_test:=v_test+1;
    end loop;
end main_proc;

```

Task 7: Function

Study the function and procedure below. They are written to calculate the total mileage for a given division name. The procedure accepts a division name and then calls a function to calculate the total mileage, which then returns the result to the procedure. The result is printed to the screen.

Your task is to ANNOTATE the code with comments so that you understand what the code is doing.

CREATE OR REPLACE PROCEDURE avemiles(divisionName varchar2)

```

is
V_divID      Branch.div%type;
V_aveMiles   personnel.salary%type;
BEGIN
SELECT div into v_divID
FROM branch WHERE divname=divisionName;
v_aveMiles:=get_aveMiles(v_divID);
DBMS_OUTPUT.PUT_LINE('Division '||v_divID||' has '||v_aveMiles||' average mileage');
END;

```

CREATE OR REPLACE FUNCTION get_aveMiles (i_div IN NUMBER)

```

RETURN number
IS
v_aveMiles Transport.Mileage%type;
BEGIN
    SELECT avg(Mileage)
    INTO v_aveMiles FROM Transport
    WHERE div=i_div;
    RETURN v_aveMiles;
END get_aveMiles;

```

You can TEST the function on its own using the following code:

```
SELECT get_avemiles(10) from dual;
```

You can now test the Procedure (which calls the function you have already tested) using the following:

```
Execute avemiles('ADMIN')
```

So now you can play around with the code by trying it out on different Division Names to see if it works.

What would you change if you wanted to calculate the maximum mileage for any division?

Task 8: More practice with functions.

Study the code below which uses functions embedded within a main function to do some fairly trivial arithmetic.

Again, see if you can work out what the output from the program function would be by tracing control within the code and record it below. Pay particular attention to the RETURN.

```
create or replace function calculate
(v_1 in number, op in varchar2, v_2 in number)
return number
is
v_return number;
function add
return number
is
begin
return v_1+v_2;
end add;
function subtract
return number
is
begin
return v_1-v_2;
end subtract;
function multiply
return number
is
begin
return v_1*v_2;
end multiply;
function divide
return number
is
begin
return v_1/v_2;
end divide;
begin
if op='+' then v_return:=Add;
elsif op='-' then v_return:=subtract;
elsif op='*' then v_return:=multiply;
elsif op='/' then v_return:=divide;
else v_return:=null;
end if;
return v_return;
end calculate;
```

To test the program you can use Oracle's DUAL dummy table in SELECT statements. For instance, try:

```
SELECT calculate(2,'+',3) from dual;
```

This should call the function and perform the arithmetic for you. Make sure you understand how the 'calling' is achieved in the above statement.

Try passing various parameters to test the code works. Try passing a zero for a division for example!

Task 9: The code below is similar in that it calculates an average result.

We know we can calculate the average easily in SQL, but just for illustration purposes see how the function achieves the result then see if you can expand the code to perform the **minimum** and **maximum** salary as well.

```

create or replace function calc_stats
(OP VARCHAR2)
return number
is
v_return number;
function average
return number
is
v1 number;
begin
select avg(salary) into v1 from personnel;
return v1;
end average;
begin
if op='average' then v_return:=average;
end if;
return v_return;
end calc_stats;

```

Remember to test the code by typing `SELECT calc_stats('average') from dual;`

Task 10: Developing your cursor skills

Create a routine that could be run each month to **insert** pension contribution details into a PENSIONS table. So create the table first.

```

CREATE TABLE MY_PENSIONS
(snum          NUMBER(4),
P_employee     NUMBER(9,2),
P_employer     NUMBER(9,2),
P_date        DATE);

```

Your code should accept three prompts:

- a) the date
- b) the amount of employee contribution (less than 10%).
- c) the amount of employer contribution (less than 10%).

The calculation you need to consider is simply:

Salary * contribution /12 (as it is a monthly contribution).

You'll need to declare variables for all of your prompts and for anchoring variables to the datatypes in the PENSIONS table for the insertion of data.

Task 11: Developing function skills

Write a function that calculates *tax* on a personnel member's salary. You should then be able to test your function by typing something like:

`SELECT surname, first name, salary, tax(35000,500) from dual;` (the two parameters being salary and bonus respectively).

Things you need to know and incorporate (read carefully and try to work out the formulae from the information given):

1. Pass two parameters for salary and bonus
2. **Taxable salary** is the salary + bonus – tax allowance
3. **Tax allowance** is a constant at £4335

4. There are two **tax limits** at £3999 (lower) and £28999 (upper)
5. Salary is tested against these tax limits
6. If salary is less than the lower tax limit then tax is calculated as 10% of taxable salary
7. If salary is between the two tax limits then tax is calculated as 22% of taxable salary
8. If salary is higher than the upper tax limit then tax is calculated as:

22% of the upper limit + 40% of the difference between the taxable salary and the upper limit.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

LAN SWITCHING AND WIRELESS LAB

Code	L	T	P/FW	CREDITS
MCA523	-	-	2	1

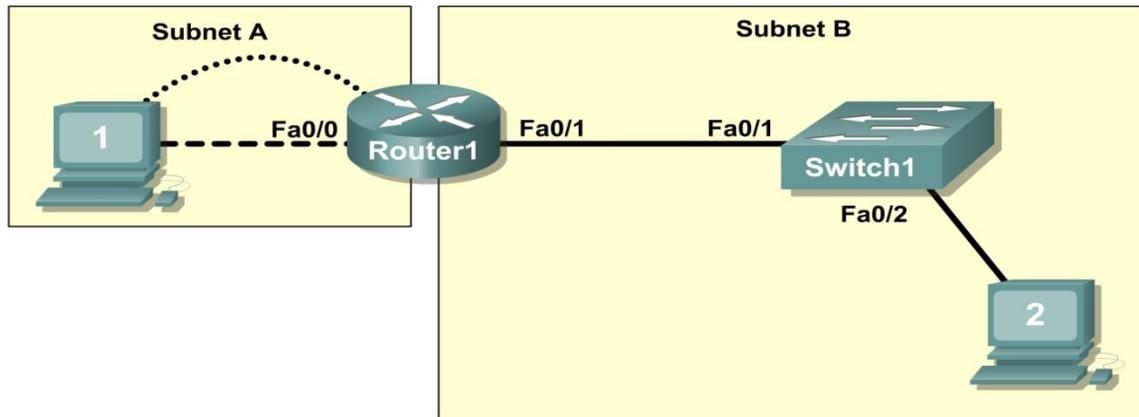
Course Contents:

Lab I: Review of Concepts from Exploration 1

- Create a logical topology given network requirements
- Create subnets to meet host requirements
- Configure the physical topology
- Configure the logical topology
- Verify network connectivity
- Configure and verify passwords

Lab II: Troubleshooting a Small Network

Topology Diagram



- Verify that a paper design meets stated network requirements
- Cable a network according to the topology diagram
- Erase the startup configuration and reload a router to the default state
- Load the routers with supplied scripts
- Discover where communication is not possible
- Gather information about the misconfigured portion of the network along with any other errors
- Analyze information to determine why communication is not possible
- Propose solutions to network errors
- Implement solutions to network errors

Examine the Logical LAN Topology

The IP address block of 172.16.30.0 /23 is subnetted to meet the following requirements:

Subnet	Number of Hosts
Subnet A	174
Subnet B	60

Additional requirements and specifications:

- The 0 subnet is used.
- The smallest possible number of subnets that satisfy the requirements for hosts should be used, keeping the largest possible block in reserve for future use.
- Assign the first usable subnet to Subnet A.
- Host computers use the first IP address in the subnet. The network router uses the last network host address.

Based on these requirements, the following topology has been provided to you:

Subnet A	
Specification	Value
IP mask (decimal)	255.255.255.0
IP address	172.16.30.0
First IP host address	172.16.30.1
Last IP host address	172.16.30.254

Subnet B	
Specification	Value
IP mask (decimal)	255.255.255.128
IP address	172.16.31.0
First IP host address	172.16.31.1
Last IP host address	172.16.31.126

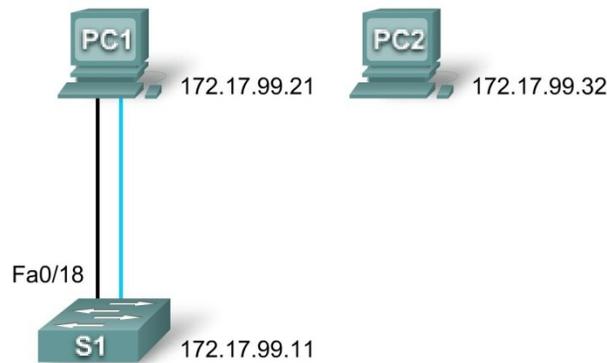
Examine each of the values in the tables above and verify that this topology meets all requirements and specifications. Are any of the given values incorrect? _____

If yes, correct the values in the table above and write the corrected values below:

Create a configuration table similar to the one below using your corrected values:

Device	IP address	Mask	Gateway
Host1	172.16.30.1	255.255.255.0	172.16.30.254
Router1–Fa0/0	172.16.30.254	255.255.255.0	N/A
Host2	172.16.31.1	255.255.255.128	172.16.31.126
Router1–Fa0/1	172.16.31.126	255.255.255.128	N/A

Lab III: Basic Switch Configuration



Addressing Table

Device	Interface	IP address	Mask	Gateway
PC1	NIC	172.17.99.21	255.255.255.0	172.17.99.1
PC2	NIC	172.17.99.32	255.255.255.0	172.17.99.1
S1	VLAN99	172.17.99.11	255.255.255.0	172.17.99.1

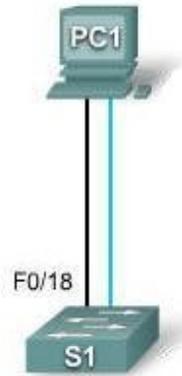
Learning Objectives

- Cable a network according to the topology diagram
- Clear an existing configuration on a switch
- Examine and verify the default configuration
- Create a basic switch configuration, including a name and an IP address
- Configure passwords to ensure that access to the CLI is secured
- Configure switch port speed and duplex properties for an interface
- Configure basic switch port security

- Manage the MAC address table
- Assign static MAC addresses
- Add and move hosts on a switch

LAB IV: Managing Switch Operating System and Configuration Files

Topology Diagram



Addressing Table

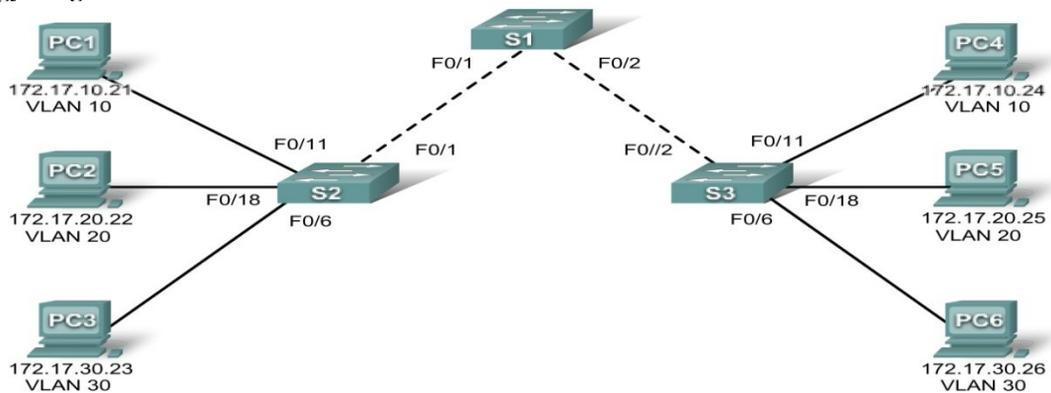
Device	Hostname	Interface	IP Address	Subnet Mask	Default Gateway
PC1	Host-A	NIC	172.17.99.21	255.255.255.0	172.17.99.1
S1	ALSwitch	VLAN99	172.17.99.11	255.255.255.0	172.17.99.1

Learning Objectives

- Create and save a basic switch configuration
- Set up a TFTP server on the network
- Back up the switch Cisco IOS software to a TFTP server and then restore it
- Back up the switch configuration to a TFTP server
- Configure a switch to load a configuration from a TFTP server
- Upgrade the Cisco IOS software from a TFTP server

Lab V: Basic VLAN Configuration

Topology Diagram



Addressing Table

Device	VLAN	IP Address	Subnet	Gateway
S1	VLAN 99	172.17.99.11	255.255.255.0	N/A
S2	VLAN 99	172.17.99.12	255.255.255.0	N/A
S3	VLAN 99	172.17.99.13	255.255.255.0	N/A
PC1	NIC	172.17.10.21	255.255.255.0	172.17.10.1
PC2	NIC	172.17.20.22	255.255.255.0	172.17.20.1
PC3	NIC	172.17.30.23	255.255.255.0	172.17.30.1
PC4	NIC	172.17.10.24	255.255.255.0	172.17.10.1
PC5	NIC	172.17.20.25	255.255.255.0	172.17.20.1
PC6	NIC	172.17.30.26	255.255.255.0	172.17.30.1

Initial Port Assignments (Switches 2 and 3)

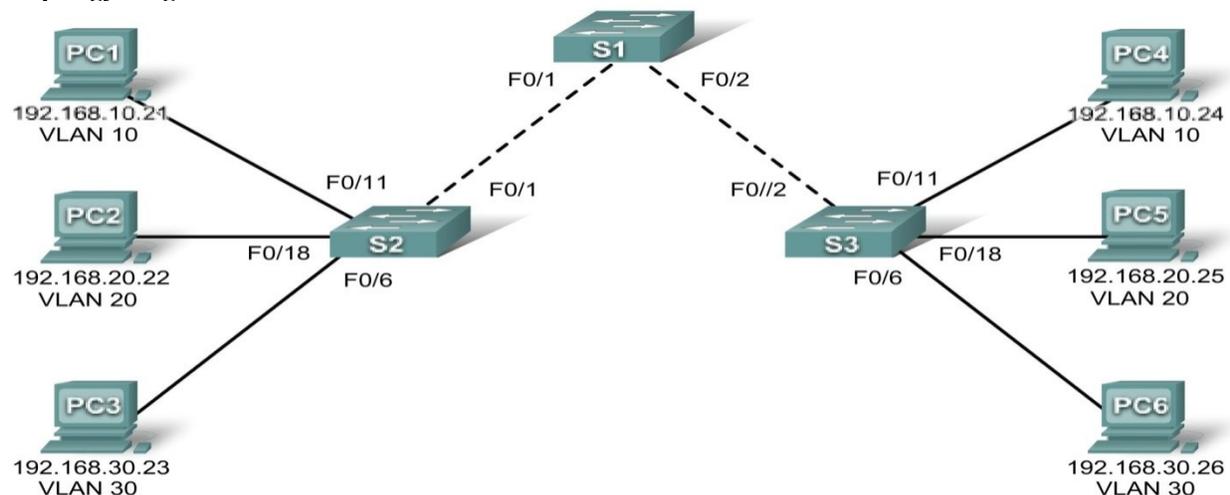
Ports	Assignment	Network
Fa0/1 – 0/5	802.1q Trunks (Native VLAN 99)	172.17.99.0 /24
Fa0/6 – 0/10	VLAN 30 – Guest (Default)	172.17.30.0 /24
Fa0/11 – 0/17	VLAN 10 – Faculty/Staff	172.17.10.0 /24
Fa0/18 – 0/24	VLAN 20 – Students	172.17.20.0 /24

Learning Objectives

- Cable a network according to the topology diagram
- Erase the startup configuration and reload a switch to the default state
- Perform basic configuration tasks on a switch
- Create VLANs
- Assign switch ports to a VLAN
- Add, move, and change ports
- Verify VLAN configuration
- Enable trunking on inter-switch connections
- Verify trunk configuration
- Save the VLAN configuration

Lab VI: Troubleshooting VLAN Configurations

Topology Diagram



Addressing Table

S1	VLAN 56	192.168.56.11	255.255.255.0	N/A
S2	VLAN 56	192.168.56.12	255.255.255.0	N/A
S3	VLAN 56	192.168.56.13	255.255.255.0	N/A
PC1	NIC	192.168.10.21	255.255.255.0	192.168.10.1
PC2	NIC	192.168.20.22	255.255.255.0	192.168.20.1
PC3	NIC	192.168.30.23	255.255.255.0	192.168.30.1
PC4	NIC	192.168.10.24	255.255.255.0	192.168.10.1
PC5	NIC	192.168.20.25	255.255.255.0	192.168.20.1
PC6	NIC	192.168.30.26	255.255.255.0	192.168.30.1

Initial Port Assignments (Switches 2 and 3)

Ports	Assignment	Network
Fa0/1 – 0/5	802.1q Trunks (Native VLAN 56)	192.168.56.0 /24
Fa0/6 – 0/10	VLAN 30 – Guest (Default)	192.168.30.0 /24
Fa0/11 – 0/17	VLAN 10 – Faculty/Staff	192.168.10.0 /24
Fa0/18 – 0/24	VLAN 20 – Students	192.168.20.0 /24

In this lab, you will practice troubleshooting a misconfigured VLAN environment. Load or have your instructor load the configurations below into your lab gear. Your objective is to locate and correct any and all errors in the configurations and establish end-to-end connectivity. Your final configuration should match the topology diagram and addressing table. All passwords are set to **cisco**, except the enable secret password, which is set to **class**.

Task 1: Prepare the Network

Step 1: Cable a network that is similar to the one in the topology diagram.

Step 2: Clear any existing configurations on the switches, and initialize all ports in the shutdown state.

Step 3: Import the configurations below.

Switch 1

```

hostname S1
no ip domain-lookup
enable secret class
!
!
interface range FastEthernet0/1-5
switchport mode trunk
!
interface range FastEthernet0/6-24
shutdown
!
interface Vlan1
no ip address
no ip route-cache
!
interface Vlan56
ip address 192.168.56.11 255.255.255.0
no ip route-cache
!
line con 0
logging synchronous
line vty 0 4
no login
line vty 5 15
password cisco
login
!
end

```

Switch 2

```
hostname S2
no ip domain-lookup
enable secret class
!
vlan 10,20,30,56
!
interface range FastEthernet0/1-5
switchport trunk native vlan 56
switchport mode access
!
interface range FastEthernet0/6-10
switchport access vlan 30
switchport mode access
!
interface range FastEthernet0/11-17
switchport access vlan 10
switchport mode access
!
interface range FastEthernet0/18-24
switchport access vlan 20
switchport mode access
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
ip address 192.168.56.12 255.255.255.0
no ip route-cache
shutdown
!
line con 0
password cisco
login
line vty 0 4
password cisco
login
line vty 5 15
password cisco
login
!
end
```

Switch 3

```
hostname S3
no ip domain-lookup
enable secret class
!
vlan 10,20,30
!
interface range FastEthernet0/1-5
switchport trunk native vlan 56
switchport mode trunk
!
interface range FastEthernet0/6-10
switchport mode access
!
interface range FastEthernet0/11-17
switchport mode access
!
interface range FastEthernet0/18-24
```

```

switchport mode access
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
no ip address
no ip route-cache
shutdown
!
interface Vlan56
no ip route-cache
!
line con 0
password cisco
login
line vty 0 4
password cisco
login
line vty 5 15
password cisco
login
!
end

```

Task 2: Troubleshoot and Repair the VLAN Configuration

Task 3: Document the Switch Configurations

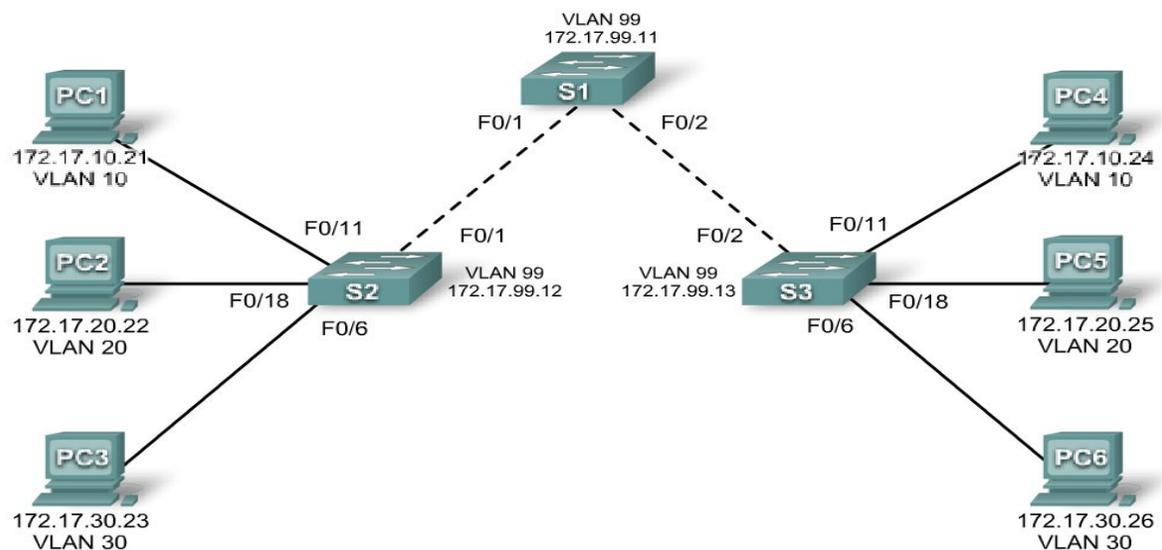
On each switch, capture the running configuration to a text file and save for future reference:

Task 4: Clean Up

Erase the configurations and reload the switches. Disconnect and store the cabling. For PC hosts that are normally connected to other networks (such as the school LAN or to the Internet), reconnect the appropriate cabling and restore the TCP/IP settings.

Lab VII: Basic VTP Configuration

Topology Diagram



Addressing Table

Device	VLAN	IP Address	Subnet Mask	Default Gateway
S1	VLAN 99	172.17.99.11	255.255.255.0	N/A
S2	VLAN 99	172.17.99.12	255.255.255.0	N/A
S3	VLAN 99	172.17.99.13	255.255.255.0	N/A
PC1	NIC	172.17.10.21	255.255.255.0	172.17.10.1
PC2	NIC	172.17.20.22	255.255.255.0	172.17.20.1
PC3	NIC	172.17.30.23	255.255.255.0	172.17.30.1
PC4	NIC	172.17.10.24	255.255.255.0	172.17.10.1
PC5	NIC	172.17.20.25	255.255.255.0	172.17.20.1
PC6	NIC	172.17.30.26	255.255.255.0	172.17.30.1

Port Assignments (Switches 2 and 3)

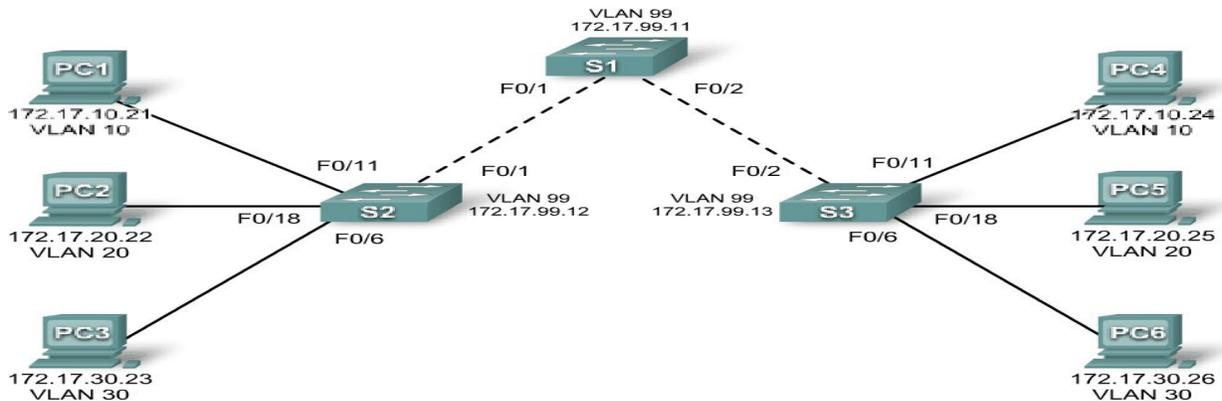
Ports	Assignment	Network
Fa0/1 – 0/5	802.1q Trunks (Native VLAN 99)	172.17.99.0 /24
Fa0/6 – 0/10	VLAN 30 – Guest (Default)	172.17.30.0 /24
Fa0/11 – 0/17	VLAN 10 – Faculty/Staff	172.17.10.0 /24
Fa0/18 – 0/24	VLAN 20 – Students	172.17.20.0 /24

Learning Objectives

- Cable a network according to the topology diagram
- Erase the startup configuration and reload a switch to the default state
- Perform basic configuration tasks on a switch
- Configure VLAN Trunking Protocol (VTP) on all switches
- Enable trunking on inter-switch connections
- Verify trunk configuration
- Modify VTP modes and observe the impact
- Create VLANs on the VTP server, and distribute this VLAN information to switches in the network
- Explain the differences in operation between VTP transparent mode, server mode, and client mode
- Assign switch ports to the VLANs
- Save the VLAN configuration
- Enable VTP pruning on the network
- Explain how pruning reduces unnecessary broadcast traffic on the LAN

Lab VIII: Troubleshooting VTP Configuration

Topology Diagram



Addressing Table

Device	VLAN	IP Address	Subnet Mask
S1	VLAN 99	172.17.99.11	255.255.255.0
S2	VLAN 99	172.17.99.12	255.255.255.0
S3	VLAN 99	172.17.99.13	255.255.255.0
PC1	NIC	172.17.10.21	255.255.255.0
PC2	NIC	172.17.20.22	255.255.255.0
PC3	NIC	172.17.30.23	255.255.255.0
PC4	NIC	172.17.10.24	255.255.255.0
PC5	NIC	172.17.20.25	255.255.255.0
PC6	NIC	172.17.30.26	255.255.255.0

Port Assignments (Switches 2 and 3)

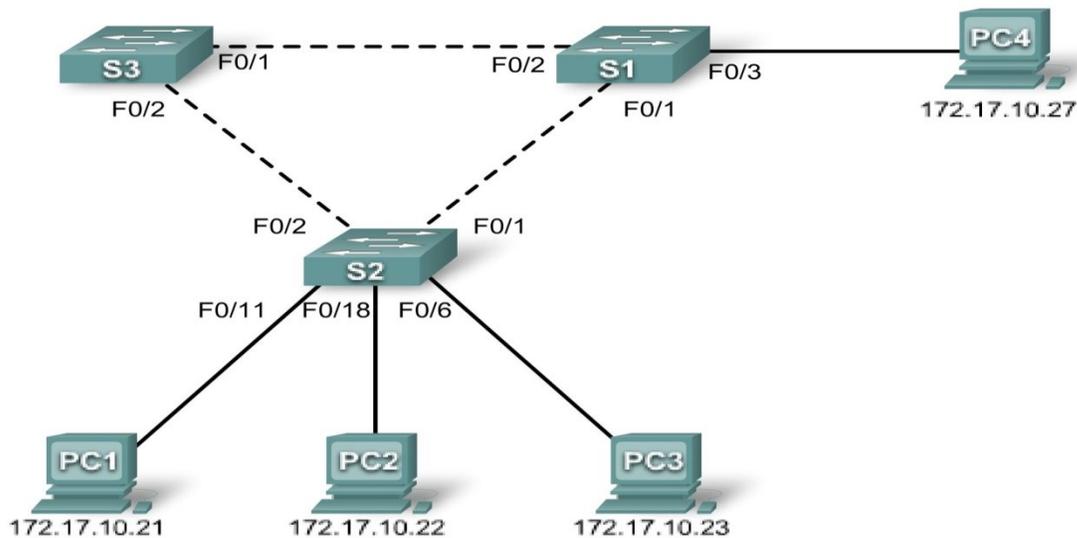
Ports	Assignment	Network
Fa0/1 – 0/5	802.1q Trunks (Native VLAN 99)	172.17.99.0 /24
Fa0/6 – 0/10	VLAN 30 – Guest (Default)	172.17.30.0 /24
Fa0/11 – 0/17	VLAN 10 – Faculty/Staff	172.17.10.0 /24
Fa0/18 – 0/24	VLAN 20 – Students	172.17.20.0 /24

Objectives

Upon completion of this lab, you will be able to:

- Cable a network according to the topology diagram
- Erase the startup configuration and vlan.dat files and reload switches to the default state
- Load the switches with supplied scripts
- Find and correct all configuration errors
- Document the corrected network

Lab IX: Basic Spanning Tree Protocol Topology Diagram



Addressing Table

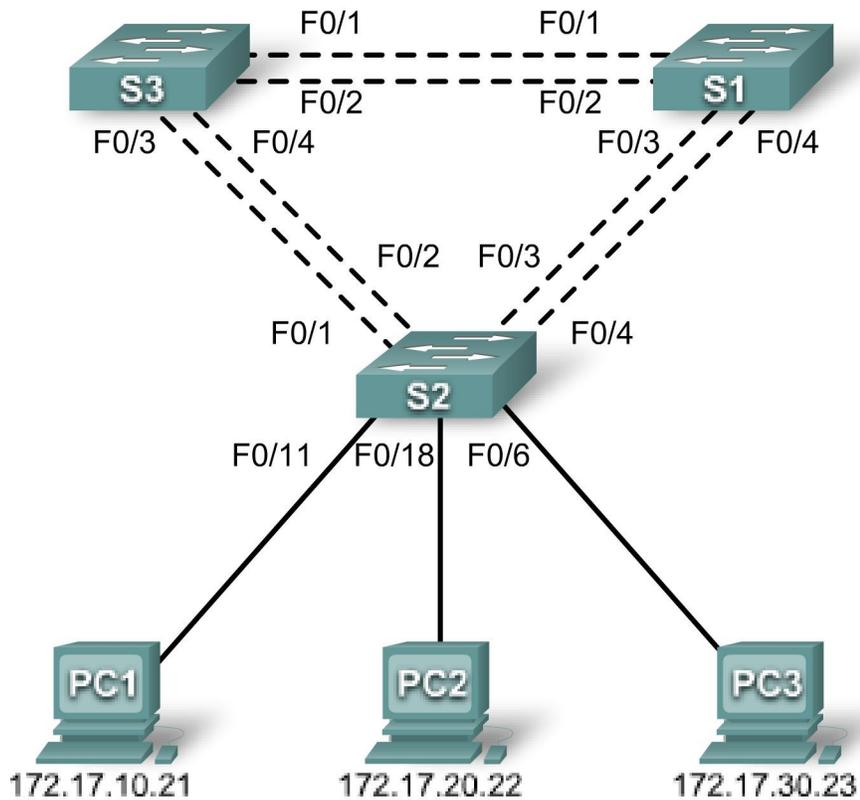
Device	Interface	IP Address	Subnet Mask	Default Gateway
S1	VLAN 1	172.17.10.1	255.255.255.0	N/A
S2	VLAN 1	172.17.10.2	255.255.255.0	N/A
S3	VLAN 1	172.17.10.3	255.255.255.0	N/A
PC1	NIC	172.17.10.21	255.255.255.0	172.17.10.254
PC2	NIC	172.17.10.22	255.255.255.0	172.17.10.254
PC3	NIC	172.17.10.23	255.255.255.0	172.17.10.254
PC4	NIC	172.17.10.27	255.255.255.0	172.17.10.254

Learning Objectives

- Cable a network according to the topology diagram
- Erase the startup configuration and reload the default configuration, setting a switch to the default state
- Perform basic configuration tasks on a switch
- Observe and explain the default behavior of Spanning Tree Protocol (STP, 802.1D)
- Observe the response to a change in the spanning tree topology

Lab X: Troubleshooting Spanning Tree Protocol

Topology Diagram



Addressing Table

Device	VLAN	IP Address	Subnet Mask	Default Gateway
S1	VLAN 99	172.17.99.11	255.255.255.0	N/A
S2	VLAN 99	172.17.99.12	255.255.255.0	N/A
S3	VLAN 99	172.17.99.13	255.255.255.0	N/A
PC1	NIC	172.17.10.21	255.255.255.0	172.17.10.1
PC2	NIC	172.17.20.22	255.255.255.0	172.17.20.1
PC3	NIC	172.17.30.23	255.255.255.0	172.17.30.1

Port Assignments – Switch 2

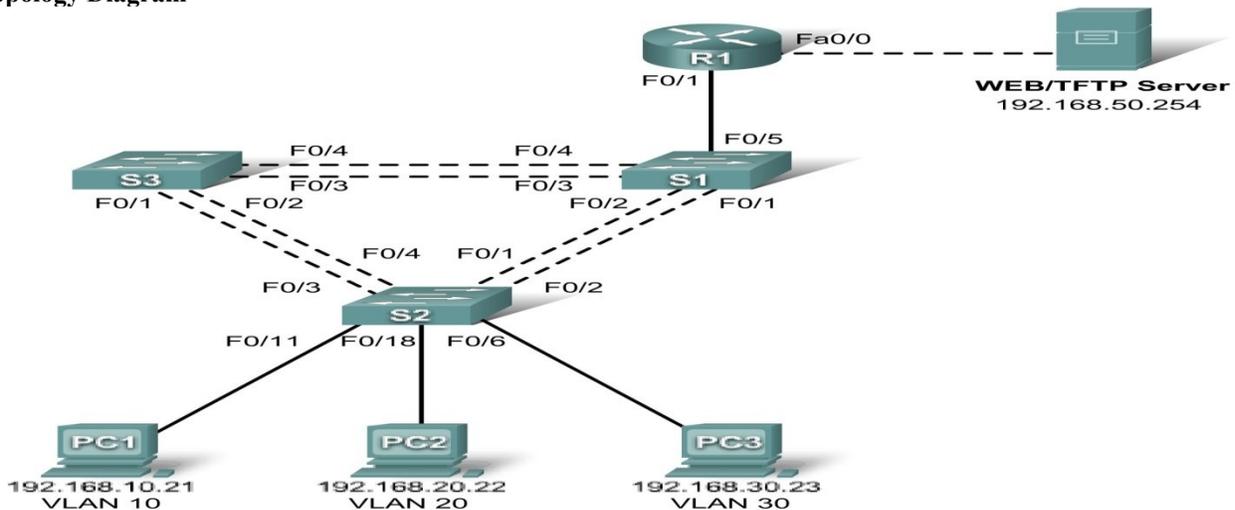
Ports	Assignment	Network
Fa0/1 – 0/4	802.1q Trunks (Native VLAN 99)	172.17.99.0 /24
Fa0/5 – 0/10	VLAN 30 – Guest (Default)	172.17.30.0 /24
Fa0/11 – 0/17	VLAN 10 – Faculty/Staff	172.17.10.0 /24
Fa0/18 – 0/24	VLAN 20 – Students	172.17.20.0 /24

Learning Objectives

- Analyze a congestion problem in a redundant, switched LAN network.
- Recognize the capabilities for per-VLAN load balancing with PVST.
- Modify the default STP configuration to optimize available bandwidth.
- Verify that modifications have had the intended effect.

You are responsible for the operation of the redundant switched LAN shown in the topology diagram. You and your users have been observing increased latency during peak usage times, and your analysis points to congested trunks. You recognize that of the six trunks configured, only two are forwarding packets in the default STP configuration currently running. The solution to this problem requires more effective use of the available trunks. The PVST+ feature of Cisco switches provides the required flexibility to distribute the inter-switch traffic using all six trunks. This lab is complete when all wired trunks are carrying traffic, and all three switches are participating in per-VLAN load balancing for the three user VLANs.

Lab XI: Inter-VLAN Routing Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
S1	VLAN 99	192.168.99.11	255.255.255.0	192.168.99.1
S2	VLAN 99	192.168.99.12	255.255.255.0	192.168.99.1
S3	VLAN 99	192.168.99.13	255.255.255.0	192.168.99.1
R1	Fa 0/0	192.168.50.1	255.255.255.0	N/A
R1	Fa 0/1	See Subinterface Configuration Table		N/A
PC1	NIC	192.168.10.21	255.255.255.0	192.168.10.1
PC2	NIC	192.168.20.22	255.255.255.0	192.168.20.1
PC3	NIC	192.168.30.23	255.255.255.0	192.168.30.1
Server	NIC	192.168.50.254	255.255.255.0	192.168.50.1

Port Assignments – Switch 2

Ports	Assignment	Network
Fa0/1 – 0/5	802.1q Trunks (Native VLAN 99)	192.168.99.0 /24
Fa0/6 – 0/10	VLAN 30 – Sales	192.168.30.0 /24
Fa0/11 – 0/17	VLAN 10 – R&D	192.168.10.0 /24
Fa0/18 – 0/24	VLAN 20 – Engineering	192.168.20.0 /24

Subinterface Configuration Table – Router 1

Router Interface	Assignment	IP Address
Fa0/1.1	VLAN1	192.168.1.1
Fa0/1.10	VLAN 10	192.168.10.1
Fa0/1.20	VLAN 20	192.168.20.1
Fa0/1.30	VLAN 30	192.168.30.1
Fa0/1.99	VLAN 99	192.168.99.1

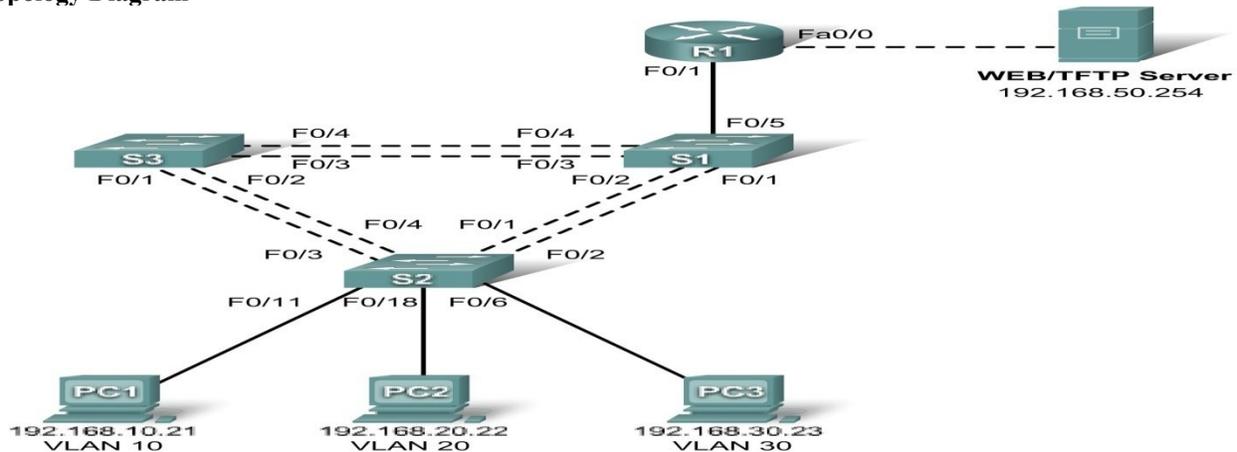
Learning Objectives

Upon completion of this lab, you will be able to to:

- Cable a network according to the topology diagram
- Clear configurations and reload a switch and a router to the default state
- Perform basic configuration tasks on a switched LAN and a router
- Configure VLANs and VLAN Trunking Protocol (VTP) on all switches
- Configure a router to support 802.1q trunking on a Fast Ethernet interface
- Configure a router with subinterfaces corresponding to the configured VLANs

Lab XII: Troubleshooting Inter-VLAN Routing

Topology Diagram



Addressing Table

S1	VLAN 99	192.168.99.11	255.255.255.0	192.168.99.1
S2	VLAN 99	192.168.99.12	255.255.255.0	192.168.99.1
S3	VLAN 99	192.168.99.13	255.255.255.0	192.168.99.1
R1	Fa 0/0	192.168.50.1	255.255.255.0	N/A
R1	Fa 0/1	See Subinterface Configuration Table		N/A
PC1	NIC	192.168.10.21	255.255.255.0	192.168.10.1
PC2	NIC	192.168.20.22	255.255.255.0	192.168.20.1
PC3	NIC	192.168.30.23	255.255.255.0	192.168.30.1
Server	NIC	192.168.50.254	255.255.255.0	192.168.50.1

Port Assignments – Switch 2

Ports	Assignment	Network
Fa0/1 – 0/5	802.1q Trunks (Native VLAN 99)	192.168.99.0 /24
Fa0/6 – 0/10	VLAN 30 – Sales	192.168.30.0 /24
Fa0/11 – 0/17	VLAN 10 – R&D	192.168.10.0 /24
Fa0/18 – 0/24	VLAN 20 – Engineering	192.168.20.0 /24

Subinterface Configuration Table – Router 1

Router Interface	Assignment	IP Address
Fa0/1.1	VLAN1	192.168.1.1
Fa0/1.10	VLAN 10	192.168.10.1
Fa0/1.20	VLAN 20	192.168.20.1
Fa0/1.30	VLAN 30	192.168.30.1
Fa0/1.99	VLAN 99	192.168.99.1

Learning Objectives

To complete this lab:

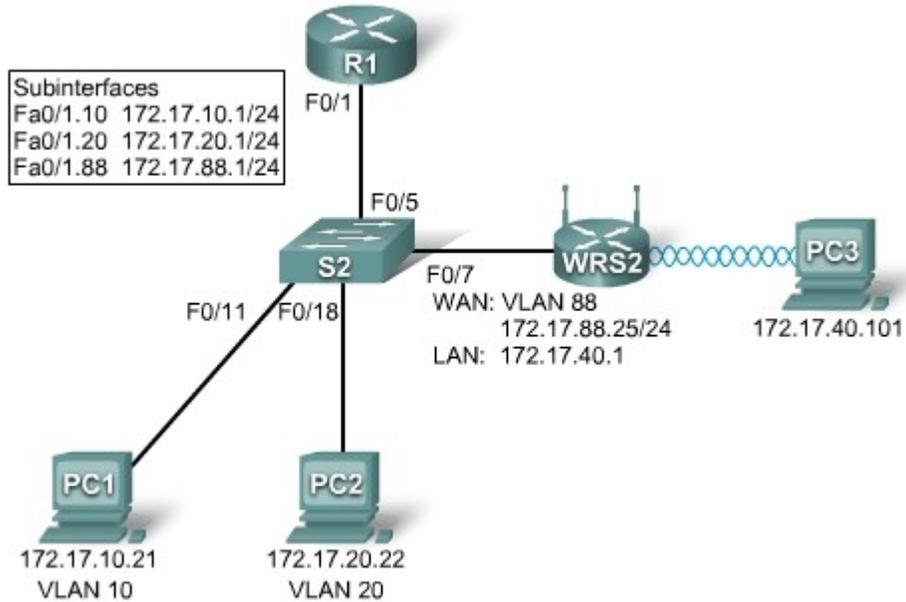
- Cable a network according to the topology diagram
- Erase any existing configurations and reload switches and the router to the default state
- Load the switches and the router with supplied scripts
- Find and correct all configuration errors
- Document the corrected network

Scenario

The network has been designed and configured to support five VLANs and a separate server network. Inter-VLAN routing is being provided by an external router in a router-on-a-stick configuration, and the server network is routed across a separate Fast Ethernet interface. However, it is not working as designed, and complaints from your users have not given much insight into the source of the problems. You must first define what is not working as expected, and then analyze the existing configurations to determine and correct the source of the problems.

This lab is complete when you can demonstrate IP connectivity between each of the user VLANs and the external server network, and between the switch management VLAN and the server network.

**Lab XIII: Basic Wireless Configuration
Topology Diagram**

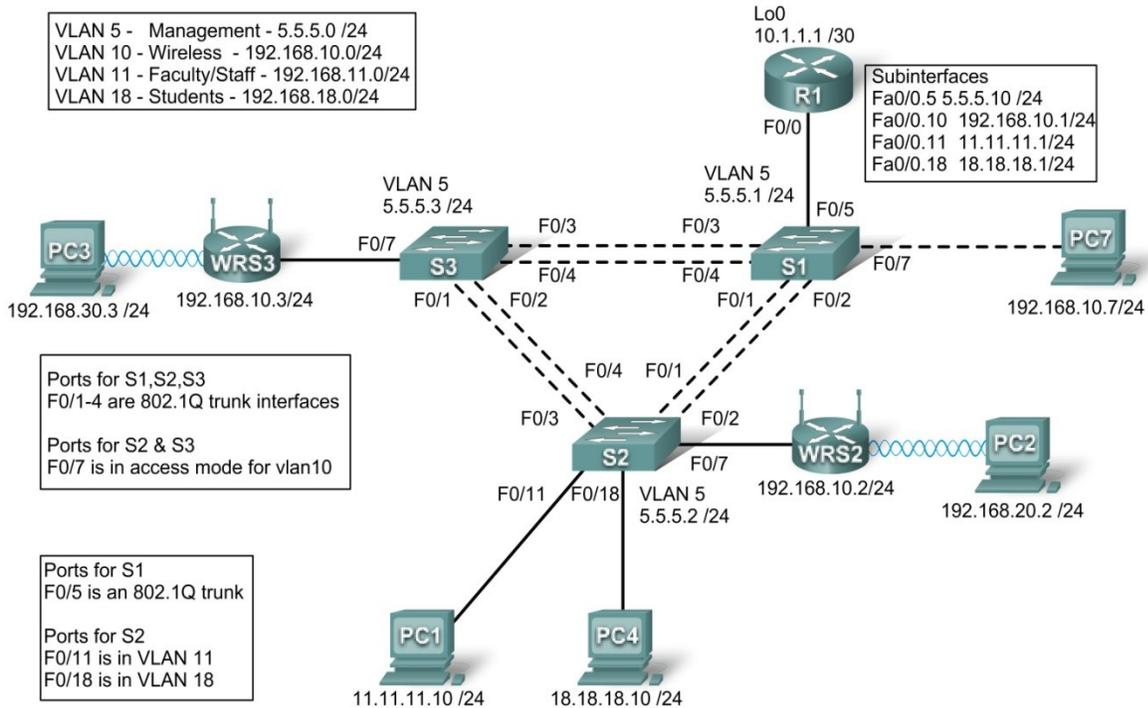


Learning Objectives

- Configure options in the Linksys Setup tab.
- Configure options in the Linksys Wireless tab.
- Configure options in the Linksys Administration tab.
- Configure options in the Linksys Security tab.
- Add wireless connectivity to a PC.
- Test connectivity.

**Lab XIV: Troubleshooting Wireless Configuration
Topology Diagram**

Topology Diagram



Addressing Table

Addressing Table				
R1	Fa0/0.5	5.5.5.10	255.255.255.0	N/A
	Fa0/0.10	192.168.10.1	255.255.255.0	N/A
	Fa0/0.11	11.11.11.1	255.255.255.0	N/A
	Fa0/0.18	18.18.18.1	255.255.255.0	N/A
	Lo0	10.1.1.1	255.255.255.252	N/A
WRS2	WAN	192.168.10.2	255.255.255.0	192.168.10.1
	LAN/Wireless	192.168.20.1	255.255.255.0	N/A
WRS3	WAN	192.168.10.3	255.255.255.0	192.168.10.1
	LAN/Wireless	192.168.30.1	255.255.255.0	N/A
PC1	NIC	11.11.11.10	255.255.255.0	11.11.11.1
PC4	NIC	18.18.18.10	255.255.255.0	18.18.18.1
S1	VLAN 5	5.5.5.1	255.255.255.0	N/A
S2	VLAN 5	5.5.5.2	255.255.255.0	N/A
S3	VLAN 5	5.5.5.3	255.255.255.0	N/A

Scenario

In this lab, a basic network and wireless network have been configured improperly. You must find and correct the misconfigurations based on the minimum network specifications provided by your company. Here are the configurations to load into your router and switches.

R1 Configuration

```
hostname R1
!
interface Loopback0
ip address 10.1.1.1 255.255.255.0
!
interface FastEthernet0/0
no ip address
duplex auto
speed auto
no shutdown
!
interface FastEthernet0/0.5
encapsulation dot1Q 5
ip address 5.5.5.10 255.255.255.0
!
interface FastEthernet0/0.10
encapsulation dot1Q 10
ip address 192.168.11.1 255.255.255.0
!
!
interface FastEthernet0/0.18
encapsulation dot1Q 18
ip address 18.18.18.1 255.255.255.0
!
ip route 192.168.20.0 255.255.255.0 192.168.10.2
ip route 192.168.30.0 255.255.255.0 192.168.10.3
!
line con 0
exec-timeout 0 0
logging synchronous
```

```
!  
end
```

Switch 1 Configuration

```
hostname S1  
!  
vtp mode transparent  
!  
vlan 5,10-11  
!  
interface FastEthernet0/1  
switchport trunk allowed vlan 5,10,11  
switchport mode trunk  
switchport trunk native vlan 5  
!  
interface FastEthernet0/2  
switchport trunk allowed vlan 5,10,11  
switchport mode trunk  
switchport trunk native vlan 5  
!  
interface FastEthernet0/3  
switchport trunk allowed vlan 5,10,11  
switchport mode trunk  
switchport trunk native vlan 5  
!  
interface FastEthernet0/4  
switchport trunk allowed vlan 5,10,11  
switchport mode trunk  
switchport trunk native vlan 5  
!  
interface FastEthernet0/5  
switchport mode trunk  
switchport trunk native vlan 5  
!  
interface Vlan5  
ip address 5.5.5.1 255.255.255.0  
no shutdown  
!  
line con 0  
exec-timeout 0 0  
logging synchronous  
!  
End
```

Switch 2 Configuration

```
hostname S2  
!  
vtp mode transparent  
ip subnet-zero  
!  
vlan 5,10-11,18  
!  
interface FastEthernet0/1  
switchport trunk allowed vlan 5,10,11,18  
switchport mode access  
!  
interface FastEthernet0/2  
switchport trunk allowed vlan 5,10,11,18  
switchport mode access  
!
```

```
interface FastEthernet0/3
switchport trunk allowed vlan 5,10,11,18
switchport mode access
!
interface FastEthernet0/4
switchport trunk allowed vlan 5,10,11,18
switchport mode access
!
interface FastEthernet0/7
switchport access vlan 10
!
interface FastEthernet0/11
switchport access vlan 11
switchport mode access
switchport port-security mac-address sticky
switchport port-security mac-address sticky 0336.5b1e.33fa
!
interface FastEthernet0/18
switchport access vlan 18
switchport mode access
switchport port-security
switchport port-security mac-address sticky
switchport port-security mac-address sticky 022c.ab13.22fb
!
interface Vlan1
no ip address
shutdown
!
interface Vlan5
ip address 5.5.5.2 255.255.255.0
no shutdown
!
line con 0
exec-timeout 0 0
logging synchronous
!
End
```

Switch 3 Configuration

```
hostname S3
!
vtp mode transparent
!
vlan 5,10-11,18
!
interface FastEthernet0/1
switchport trunk allowed vlan 5,10,11,18
switchport mode trunk
switchport trunk native vlan 5
!
interface FastEthernet0/2
switchport trunk allowed vlan 5,10,11,18
switchport mode trunk
switchport trunk native vlan 5
!
interface FastEthernet0/3
switchport trunk allowed vlan 5,10,11,18
switchport mode trunk
switchport trunk native vlan 5
!
interface FastEthernet0/4
```

```

switchport trunk allowed vlan 5,10,11,18
switchport mode trunk
switchport trunk native vlan 5
!
interface FastEthernet0/7
!
interface Vlan1
no ip address
no ip route-cache
!
interface Vlan5
ip address 6.6.6.3 255.255.255.0
no shutdown
!
line con 0
exec-timeout 0 0
logging synchronous
!
end

```

Wireless Router Network Requirements

While troubleshooting WRS2 and WRS3, ensure that at least the following capabilities exist:

1. Connections via the IP addresses shown in the topology diagram.
2. More than 30 clients can get an IP address through DHCP at a single time.
3. A client can have a DHCP address for at least 2 hours.
4. Clients using both B and G wireless network modes can connect, but N clients cannot.
5. Wireless clients must be authenticated using WEP with a key of 5655545251.
6. Traffic between PC2 and PC3 must take the most efficient route possible.
7. Ping requests coming from outside WAN ports of the Linksys routers to their inside LAN/wireless IP addresses (192.168.30.1) must be successful.
8. DHCP must not give out IP addresses in a range that includes the addresses for PC2 and PC3.
9. The two wireless networks must not interfere with each other.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ANDROID PROGRAMMING LAB

Code	L	T	P/FW	CREDITS
MCA524	-	-	2	1

The experiments will be based on the topics covered in the corresponding theory Course.

1. Write a Program to Build a Simple Android Application
2. Java Andorid Program to Demonstrate Usage of String.xml File
3. Java Andorid Program to Demonstrate Activity Life Cycle
4. Write a Program to Change the Background of your Activity
5. Java Andorid Program to Perform all Operations using Calculators
6. Write a Program to Change the Image Displayed on the Screen
7. Write a Program to Create Multiple Activities within an Application
8. Write a Program to Demonstrate Action Button by Implementing on Click Listener
9. Write a Program to Demonstrate the Sound Button Application
10. Write a Program to Demonstrate the use of Scroll View
11. Write a Program to Demonstrate Radio Group Application
12. Write a Program to Demonstrate Alert Dialog Box
13. Write a Program to Set the Wallpaper of Your Device using Bitmap Class
14. Write a Program to Demonstrate the Menu Application
15. Write a Program to Demonstrate Toast in an Application
16. Write a Program for Dividing our Activity into Fully Encapsulated Reusable Components using Fragement
17. Write a Program to Demonstrate List View Activity
18. Write a Program to Demonstrate an Advanced Xml Layout
19. Write a Program to Draw on a Canvas
20. Write a Program to Demonstrate Surface View via Thread
21. Write a Program to Demonstrate Count Down Timer Application
22. Write a Program to Demonstrate Tip Calculator
23. Write a Program to Animate Bitmap
24. Write a Program to Demonstrate Layouts in an Activity and Nesting of Layouts
25. Write a Program to Demonstrate Touch Listener
26. Write a Program to Demonstrate Motion Event on Android screen with the help of an Image
27. Write a Program to Draw a Spritesheet on a Canvas
28. Write a Program to Demonstrate an Advanced Animation Activity
29. Write a Program to Demonstrate a Simple Video View
30. Write a Program to Demonstrate Simple Animation Activity
31. Write a Program to Demonstrate a Simple to do List Application
32. Write a Program to Demonstrate an Adapter
33. Write a Program to demonstrate Advanced Adapter
34. Write a Program to Demonstrate a Simple Compound Control
35. Write a Program to Demonstrate Explicit Intent
36. Write a Program to Demonstrate Implicit Intent
37. Java Andorid Program to Demonstrate Linkify Class in Android
38. Java Andorid Program to Demonstrate a Match Filter
39. Write a Program to Demonstrate a TransformFilter
40. Write a Program to Demonstrate Broadcast Receiver
41. Write a Program to Demonstrate BroadCast Receiver to Intercept Custom Intent
42. Write a Program to Demonstrate Pending Intent

43. Write a Program to Demonstrate Ordered BroadCast
44. Write a Program to Demonstrate Intent Filter
45. Write a Program to Demonstrate Local BroadCast Manager
46. Write a Program to Monitoring Device State Changes Using Broadcast Intents
47. Write a Program to Open an Internet Data Stream
48. Write a Program to Parse Xml Using Xml Pull Parser
49. Write a Program to Parse Xml Using Dom Parser
50. Write a to demonstrate Download Manager in Android
51. Write a Program to Demonstrate Connection to an Internet Resource
52. Write a Program to Demonstrate Google Maps in Andorid
53. Write a Program to Demonstrate Zoom-IN and Zoom -Out of an image using Touch events
54. Write a Program to Demonstrate Creating and Saving Shared Preferences
55. Write a Program to Demonstrate Preference Screen
56. Write a Program to Demonstrate Subscreen in a Prefernce Screen
57. Write a Program to Demonstrate Intent in Preference Screen
58. Write a Program to Demonstrate Prefernce Fragement
59. Write a Program to Demonstrate Preference Headers
60. Write a Program to Demonstrate Preferenece Activity
61. Write a Program to Demonstrate Reading a File on SD Card
62. Write a Program to Demonstrate Reading and Writing to a File in Android
63. Write a Program to Demonstrate Instance Save State
64. Write a Program to Write to a SQLite Database in Android
65. Write a Program to Read and Write to a SQLite Database in Android
66. Write a Program to Read Write and Delete to a SQLite Database in Android
67. Write a Program to Demonstrate Content Providers in Android
68. Write a Program to Create Grade Report Using Content Providers in Android
69. Write a Program to Create Search Activity for an Application in Andorid
70. Write a Program to Demonstrate Search Interface in Android
71. Write a Program to Demonstrate Search Interface with Suggestion Provider in Android
72. Write a Program to Demonstrate Voice Search in a Search Provider
73. Write a Program to Demonstrate a Full Screen Activity
74. Write a Program to Change an Activity's Icon
75. Write a Program to Set an Activity in Potrait Mode
76. Write a Program to Set an Activity in Landscape Mode
77. Write a Program to Demonstrate Media Content Provider
78. Write a Program to Access the Contacts Contract Contact Content Provider
79. Write a Program to Demonstrate Finding contact details for a contact name
80. Write a Program to Demonstrate Performing a Caller-ID lookup
81. Write a Program to Pick Contacts Using Intent
82. Write a Program to Create New Contact Using Intent
83. Write a Program to Demonstrate Calendar Content Provider
84. Write a Program to Demonstrate to Insert a New Calendar Event Using Intent
85. Write a Program to Edit a Calendar Event Using Intent
86. Write a Program to Display a calendar event using an Intent
87. Write a Program to Demonstrate Deleting a Calendar Event in Android
88. Write a Program to Start a Service in Android
89. Write a Program to Start a Service to Vibrate Phone
90. Write a Program to Start and Stop a Service in Android
91. Write a Program to Demonstrate to Force Stop a Service in Android

92. Write a Program to Demonstrate Self Terminating Services
93. Write a Program to Start a Service in a Different Process
94. Write a Program to Create a New Thread for Service Tasks
95. Write a Program to Start a Starting Services regularly via AlarmManager in Android
96. Write a Program to Cancel an Alarm Intent
97. Java Andorid Program to Start a Service After Every Hour
98. Write a Program to Demonstrate IntentServices in Android
99. Write a Program to Demonstrate Dowloading a File Using a Service
100. Write a Program to Demonstrate Binding a Service to an Activity
101. Write a Program to Move a Service to Background in Android
102. Write a Program to Demonstrate Asynchronous Tasks in Android
103. Write a Program to Demonstrate Loaders in Android
104. Write a Program to Demonstrate Action Bar in Android
105. Write a Program to Disable the Action Bar in an Activity in Android
106. Write a Program to Hide Title Label of Action Bar in Android
107. Write a to Add Actions in Action Bar in Android
108. Write a Program to Respond to Added Actions in Action Bar in Android
109. Write a Program to Change the Displayed Text alongside the Application Icon at Runtime
110. Write a Program to Change the Background of Action Bar in Android
111. Write a Program to Dim the Software Navigation Button in your Android Application
112. Write a Program to add Action to Home Icon
113. Write a Program to add Action to Home Icon using set the parentActivityName
114. Write a Program to Enable the Split Action Bar
115. Write a Program to Add a Custom View to the ActionBar
116. Write a Program to Demonstrate Action View in Android
117. Write a Program to Demonstrate Share Action Provider in Android
118. Write a Program to Demonstrate Navigation Drawer in Android
119. Write a Program to Demonstrate Navigation Using Fragments in Android
120. Write a Program to Demonstrate adding actions to Navigation Bar in Android
121. Write a Program to Demonstrate Navigation Drawer with Different Fragement in Android
122. Write a Program to Demonstrate Tab Navigation in Android
123. Write a Program to Demonstrate Drop Down Navigaton in Android
124. Write a Program to Demonstrate Contextual Mode in Android
125. Write a Program to Show SMS in Your Phone
126. Write a Program to Display SMS from the Phone Numbers, which are in Your Contacts
127. Write a Programs to Know Your Current Location Using GPS
128. Write a Program to Calculate Distance between two points using Latitude & Longitude
129. Write a that Accepts a Location from the User, Run in the Background, and Notifies the User when he/she is within 1Km from that Location
130. Write a Program to Shows SMS from the phone numbers, which are in your contacts
131. Write a Program to Show Contacts in Your Phone
132. Write a Program to Demonstrate to Receive BroadCast in Android
133. Write a Program to Consume GPS Broad-Cast using BroadCast Receiver
134. Write a Program to Define a Style and Apply to a View
135. Write a Program to Create a Text View with Rounded Corners
136. Write a Program to Demonstrate Button with Rounded Corners
137. Write a Program to Send Message From Service to Activity
138. Write a Program to Send Data From Service to Activity in Android
139. Write a Program to Draw Driving Route on Google Maps in Android

140. Write a Program to Demonstrate Grid View Layout in Android
141. Write a Program to Demonstrate Custom Grid View Layout in Android
142. Write a Program to Customize GridView Style in Android
143. Write a Program to Demonstrate Geo Coding in Android
144. Write a Program to Get more than one Geo location of a Place
145. Write a Program to Create Simple Menu in Android
146. Write a Program to Demonstrate Creating an Options Menu in Android
147. Write a Program to Demonstrate Context Menu in Android
148. Write a Program to Demonstrate Popup Menu in Android
149. Write a Program to Demonstrate Menu Groups in Android
150. Write a Program to Demonstrate Checkable Menu Items in Android
151. Write a Program to Demonstrate Adding Menu Items Based on an Intent in Android
152. Write a Program to Demonstrate Adding a Share Action Provider to a Menu in Android
153. Write a Program to Demonstrate Defining Menu Hierarchies in XML in Android
154. Write a Program to Demonstrate Adding Shortcuts to Items in a Menu in Android
155. Write a Program to Demonstrate Date Picker Dialog in Android
156. Write a Program to Demonstrate Character Picker Dialog in Android
157. Write a Program to Demonstrate Time Picker Dialog in Android
158. Write a Program to Demonstrate Progress Dialog in Android
159. Write a Program to Demonstrate Progress Dialog with Spinning Wheel in Android
160. Write a Program to Demonstrate Parsing a Json Object
161. Write a Program to Demonstrate Custom Toast in Android
162. Write a Program to Display Custom Toast in the Center of Screen
163. Write a Program to Demonstrate Shape Drawables
164. Write a Program to Demonstrate Gradient Drawables
165. Write a Program to Demonstrate Radial Gradient in Android
166. Write a Program to Demonstrate Sweep Gradient in Android
167. Write a Program to Demonstrate Text to Speech in Android
168. Write a Program to Play Sound Using Sound Pool
169. Write a to Record Media Using Media Recorder
170. Write a Program to Send and Receive Data From Server

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMMUNICATION SKILLS - V

Code	L	T	P/FW	CREDITS
BCS511	1	-	-	1

Course Objective:

The modules are designed to enhance the communicative competence of the learners to equip them with efficient interpersonal communication.

Course Contents:

Module I: Essentials of Workplace Conversation

Language: registers (formal vs. informal) and usage
Job description and evaluation;
Relations with superiors, peers, and subordinates
Team building
Conversation Management
Non Verbal Aids

Module II: Dynamics of Group Discussion

Introduction,
Methodology
Role Functions
Mannerism
Guidelines

Module III: Communication through Electronic Channels

Introduction
Technology based Communication Tools
Video Conferencing
Web Conferencing
Selection of the Effective Tool
E-mails, Fax etc.

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File

GD – Group Discussion

GP – Group Presentation

Text & References:

- Jermy Comfort, Speaking Effectively, et.al, Cambridge
- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.
- Taylor, Conversation in Practice,

BEHAVIOURAL SCIENCE – V (INDIVIDUAL, SOCIETY AND NATION)

Code	L	T	P/FW	CREDITS
BSS511	1	-	-	1

Course Objective:

This course aims at enabling students towards understanding the importance of individual differences, better understanding of self in relation to society and nation, facilitation for a meaningful existence and adjustment in society, to inculcate patriotism and national pride, understanding workforce diversity

Course Contents:

Module I: Individual differences & Personality

Personality: Definition & Relevance
 Importance of nature & nurture in Personality Development
 Importance and Recognition of Individual differences in Personality
 Accepting and Managing Individual differences (Adjustment Mechanisms)

Module II: Socialization

Nature of Socialization
 Social Interaction
 Interaction of Socialization Process
 Contributions to Society & Nation

Module III: Patriotism and National Pride

Sense of Pride and Patriotism
 Importance of Discipline and hard work
 Integrity and accountability

Module IV: Human Rights, Values and Ethics

Meaning of Human Rights
 Human Rights Awareness
 Importance of human rights
 Values and Ethics

Module V: Workforce Diversity & Peace

Globalization and workforce
 Gender Sensitization
 Respect for diversity
 Power of peace

Module VI: End-of-Semester Appraisal

Viva based on personal journal
 Assessment of Behavioural change as a result of training
 Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- Robbins O.B. Stephen; Organizational Behaviour

FRENCH - V

Code	L	T	P/FW	CREDITS
FLF511	2	-	-	2

Course Objective:

To furnish some basic knowledge of French culture and civilization for understanding an authentic document and information relating to political and administrative life

Course Contents:

Module D: pp. 131 – 156 Unités 10, 11

Contenu lexical: Unité 10: Prendre des décisions

1. Faire des comparaisons
2. décrire un lieu, le temps, les gens, l'ambiance
3. rédiger une carte postale

Unité 11: faire face aux problèmes

1. Exposer un problème.
2. parler de la santé, de la maladie
3. interdire/demander/donner une autorisation
4. connaître la vie politique française

Contenu grammatical:

1. comparatif - comparer des qualités/ quantités/actions
2. supposition: Si + présent, futur
3. adverbe - caractériser une action
4. pronom "Y"

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - V

Code	L	T	P/FW	CREDITS
FLG511	2	-	-	2

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Introduction to Advanced Grammar and Business Language and Professional Jargon

Course Contents:

Module I: Genitive case

Genitive case – Explain the concept of possession in genitive

Mentioning the structure of weak nouns

Module II: Genitive prepositions

Discuss the genitive prepositions and their usage: (während, wegen, statt, trotz)

Module III: Reflexive verbs

Verbs with accusative case

Verbs with dative case

Difference in usage in the two cases

Module IV: Verbs with fixed prepositions

Verbs with accusative case

Verbs with dative case

Difference in the usage of the two cases

Module V: Texts

A poem 'Maxi'

A text Rocko

Module VI: Picture Description

Firstly recognize the persons or things in the picture and identify the situation depicted in the picture;

Secondly answer questions of general meaning in context to the picture and also talk about the personal experiences which come to your mind upon seeing the picture.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH - V

Code	L	T	P/FW	CREDITS
FLS511	2	-	-	2

Course Objective:

To enable students acquire working knowledge of the language; to give them vocabulary, grammar, voice modulations/intonations to handle everyday Spanish situations with ease.

Course Contents:

Module I

Revision of earlier semester modules

Module II

Future Tense

Module III

Presentations in English on
Spanish speaking countries'

Culture

Sports

Food

People

Politics

Society

Geography

Module IV

Situations:

En el hospital

En la comisaria

En la estacion de autobus/tren

En el banco/cambio

Module V

General revision of Spanish language learnt so far.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Español Sin Fronteras, Greenfield

CHINESE – V

Code	L	T	P/FW	CREDITS
FLC511	2	-	-	2

Course Objective:

What English words come from Chinese? Some of the more common English words with Chinese roots are ginseng, silk, dim sum, fengshui, typhoon, yin and yang, T'ai chi, kung-fu. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I

Drills

Dialogue practice

Observe picture and answer the question.

Pronunciation and intonation.

Character writing and stroke order

Module II

Intonation

Chinese foods and tastes – tofu, chowmian, noodle, Beijing duck, rice, sweet, sour...etc. Learning to say phrases like – Chinese food, Western food, delicious, hot and spicy, sour, salty, tasteless, tender, nutritious, good for health, fish, shrimps, vegetables, cholesterol is not high, pizza, milk, vitamins, to be able to cook, to be used to, cook well, once a week, once a month, once a year, twice a week.....

Repetition of the grammar and verbs taught in the previous module and making dialogues using it.

Compliment of degree “de”.

Module III

Grammar the complex sentence “suiran ... danshi....”

Comparison – It is colder today than it was yesterday.....etc.

The Expression “chule....yiwai”. (Besides)

Names of different animals.

Talking about Great Wall of China

Short stories

Module IV

Use of “huozhe” and “haishi”

Is he/she married?

Going for a film with a friend.

Having a meal at the restaurant and ordering a meal.

Module V

Shopping – Talking about a thing you have bought, how much money you spent on it? How many kinds were there? What did you think of others?

Talking about a day in your life using compliment of degree “de”. When you get up? When do you go for class? Do you sleep early or late? How is Chinese? Do you enjoy your life in the hostel?

Making up a dialogue by asking question on the year, month, day and the days of the week and answer them.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader ” Part-II Lesson 39-46

DISSERTATION / PROJECT WORK

Code	L	T	P/FW	CREDITS
MCA661	-	-	-	30

GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation.

Research is genuine exploration of the unknown that leads to new knowledge, which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page

Table of Contents

Acknowledgement

Student Certificate

Company Profile

Introduction

Chapters

Appendices

References / Bibliography

➤ **Title or Cover Page or Front Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

➤ **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

➤ **Acknowledgement**

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

➤ **Student Certificate**

Given by the Institute.

➤ **Company Certificate & Profile**

This is a certificate, which the company gives to the students. A Company Profile corresponds to a file with company-specific data. Company data can be stored there and included in a booking when needed.

➤ **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

➤ **Chapters**

All chapters and sections must be appropriately numbered, titled and should neither be too long nor too short in length. The first chapter should be introductory in nature and should outline the background of the project, the problem being solved, the importance, other related works and literature survey. The other chapters would form the body of the report. The last chapter should be concluding in nature and should also discuss the future prospect of the project.

➤ **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

➤ **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The File should fulfill the following *assessment objectives*:

1. Writing a critical literature review
 - Search for literature
 - Summarizing and presenting the literature
 - Evaluating key content and theories
2. Collecting and analyzing research material
 - Choosing and designing research method
 - Conducting the research
 - Analyzing, sorting and classifying the data to make decision
3. Interpreting research method and draw conclusion
 - Findings
 - Recommendation
4. Assigning the theories and writing the project report
 - Structuring the project in accordance with the given style
5. Bibliography
 - This refer to the books, Journals and other documents consulting while working on the project

Examination Scheme:

Components	MRP	V	S	FP	R
Weightage (%)	20	20	20	20	20

MRP – Mid Report Presentation, V – Viva, S – Synopsis, FP – Final Presentation, R - Report