

**Master of Computer Applications**

**Programme Code: MCA**

**Duration – 3 Years Full Time**

**Programme Structure  
and  
Curriculum & Scheme of Examination  
2018-2021**

**AMITY UNIVERSITY**

**RAJASTHAN**

## PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

<u>Components</u>	<u>Codes</u>	<u>Weightage (%)</u>
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

July, 2018

**PROGRAMME STRUCTURE  
2018-21**

**FIRST SEMESTER**

S. No.	Course Title	Lecture	Tutorial	Practical	Total
		(L)	(T)	(P)	Credits
<b>CORE COURSE (CC)</b>					
MCA101	Computer programming Using C & C++	2	1	-	3
MCA102	Database Management System	2	1	-	3
MCA103	Computer Organization & Architecture	2	1	-	3
MCA104	Mathematical Foundation to Computer Science	2	1	-	3
MCA121	Computer Programming Using C & C++ Lab	-	-	2	1
MCA122	Database Management System Lab	-	-	2	1
<b>DOMAIN ELECTIVES (DE)</b>					
<b>Elective-I (Without Lab)</b>	<b>Select any ONE</b>				
MCA131	Cyber Security & Cyber laws	2	1	-	3
MCA132	System Analysis & Design				
<b>Elective-II (WithLab)</b>	<b>Select any ONE</b>				
MCA133	Internet of Things	2	1	-	3
MCA134	Multimedia Tools-I				
MCA135	Probability and Statistical Structure				
MCA143	Internet of Things Lab	-	-	2	1
MCA144	Multimedia Tools-I Lab				
MCA145	Probability and Statistical Structure Lab				
	<b>TOTAL</b>				<b>21</b>

## SECOND SEMESTER

S. No.	Course Title	Lecture	Tutorial	Practical	Total
		(L)	(T)	(P)	Credits
<b>CORE COURSE (CC)</b>					
MCA201	Data and File Structures using C	2	1	-	3
MCA202	Operating System	2	1	-	3
MCA203	Data Communication & Computer Networking	2	1	-	3
MCA204	Computer Oriented Numerical Analysis	2	1	-	3
MCA221	Data and File Structures using C LAB	-	-	2	1
MCA222	Operating System Lab	-	-	2	1
<b>DOMAIN ELECTIVES (DE)</b>					
<b>Elective-I (Without Lab)</b>	<b>Select any ONE</b>				
MCA231	Management Information System	2	1	-	3
MCA232	Cyber Forensic				
MCA233	E-Commerce & Secure Transactions				
<b>Elective-II (WithLab)</b>	<b>Select any ONE</b>				
MCA234	Information Security	2	1	-	3
MCA235	MATLAB				
MCA236	Multimedia Tools-II				
MCA244	Information Security Lab	-	-	2	1
MCA245	MATLAB Lab				
MCA246	Multimedia Tools-II Lab				
<b>Non Teaching Credit Course (NTCC)</b>					
MCA251	Report on Industry Visit	-	-	-	1
	<b>TOTAL</b>				<b>22</b>

### THIRD SEMESTER

S. No.	Course Title	Lecture	Tutorial	Practical	Total
		(L)	(T)	(P)	Credits
<b>CORE COURSE (CC)</b>					
MCA301	Optimization Technique	2	1	-	3
MCA302	Core Java	2	1	-	3
MCA303	Advanced Database Management System	2	1	-	3
MCA322	Core Java Lab	-	-	2	1
MCA323	Advanced Database Management System Lab	-	-	2	1
<b>DOMAIN ELECTIVES (DE)</b>					
<b>Elective-I (Without Lab)</b>	<b>Select any ONE</b>				
MCA331	Mobile Computing	2	1	-	3
MCA332	Theory of Computation				
MCA333	Analysis and Design of Algorithms				
<b>Elective-II (WithLab)</b>	<b>Select any ONE</b>				
MCA334	Computer Graphics	2	1	-	3
MCA335	Data Warehousing and Mining				
MCA336	Open Source Technology				
MCA337	Network Fundamental				
MCA344	Computer Graphics Lab	-	-	2	1
MCA345	Data Warehousing and Mining Lab				
MCA346	Open Source Technology Lab				
MCA347	Network Fundamental Lab				
<b>OPEN ELECTIVES (OE)</b>					
	Open Elective	2	1	-	3
<b>Non Teaching Credit Course (NTCC)</b>					
MCA351	Report on Workshop / Social Work	-	-	-	1
<b>VALUE ADDED COURSES (VAC)</b>					
BCS311	Communication Skills -III	1	-	-	1
BSS313	Behavioural Science –III (Leading Through Teams)	1	-	-	1
FLT311	French	2	-	-	2
FLG311	German				
FLS311	Spanish				
FLC311	Chinese				
	<b>TOTAL</b>				<b>26</b>

#### FOURTH SEMESTER

S. No.	Course Title	Lecture	Tutorial	Practical	Total
		(L)	(T)	(P)	Credits
<b>CORE COURSE (CC)</b>					
MCA401	Software Engineering & Project Management	2	1	-	3
MCA402	Advanced Java	2	1	-	3
MCA403	Distributed Operating System	2	1	-	3
MCA421	Software Engineering & Project Management Lab	-	-	2	1
MCA422	Advanced Java Lab	-	-	2	1
MCA450	Minor Project	-	-	-	6
<b>DOMAIN ELECTIVES (DE)</b>					
<b>Elective-I (Without Lab)</b>	<b>Select any ONE</b>				
MCA431	Cloud Computing	2	1	-	3
MCA432	Soft Computing				
MCA433	High Performance Computing				
MCA434	Embedded System				
MCA435	Accessing the WAN				
<b>Elective-II (With Lab)</b>	<b>Select any ONE</b>				
MCA436	ASP.NET using C#	2	1	-	3
MCA437	PHP				
MCA438	Routing Protocol & Concept				
MCA439	Statistical Analysis using R				
MCA446	ASP.NET using C# Lab	-	-	2	1
MCA447	PHP Lab				
MCA448	Routing Protocol & Concept Lab				
MCA449	Statistical Analysis using R Lab				
<b>OPEN ELECTIVES (OE)</b>					
	Open Elective	2	1	-	3
<b>VALUE ADDED COURSES (VAC)</b>					
BCS411	Communication Skills -IV	1	-	-	1
BSS413	Behavioral Science –IV (Personal and Professional Excellence)	1	-	-	1
FLT411	Foreign Language	2	-	-	2
	French				
FLG411	German				
FLS411	Spanish				
FLC411	Chinese				
	<b>TOTAL</b>				<b>31</b>

### FIFTH SEMESTER

S. No.	Course Title	Lecture	Tutorial	Practical	Total
		(L)	(T)	(P)	Credits
<b>CORE COURSE (CC)</b>					
MCA501	Artificial Intelligence	2	1	-	3
MCA502	Information Storage Management	2	1	-	3
MCA521	Artificial Intelligence Lab	-	-	2	1
MCA550	Minor Project	-	-	-	6
MCA551	Summer Internship Project	-	-	-	3
<b>DOMAIN ELECTIVES (DE)</b>					
<b>Elective-I (Without Lab)</b>	<b>Select any ONE</b>				
MCA531	Search Engine Optimization	2	1	-	3
MCA532	Digital Marketing Analytics				
MCA533	Compiler Design				
MCA534	Digital Image Processing				
MCA535	Salesforce Technology				
<b>Elective-II (WithLab)</b>	<b>Select any ONE</b>				
MCA536	LAN Switching & Wireless	2	1	-	3
MCA537	Python				
MCA538	Big Data & Analytic using R				
MCA539	Android Programming				
MCA546	LAN Switching & Wireless Lab	-	-	2	1
MCA547	Python Lab				
MCA548	Big Data & Analytic using R Lab				
MCA549	Android Programming Lab				
<b>Non Teaching Credit Course (NTCC)</b>					
MCA551	Report on Paper Presentation in Conference	-	-	-	1
<b>VALUE ADDED COURSES (VAC)</b>					
BCS511	Communication Skills -V	1	-	-	1
BSS513	Behavioral Science-V (Individual Society and Nation)	1	-	-	1
FLT511 FLG511 FLS511 FLC511	Foreign Language	2	-	-	2
	French				
	German				
	Spanish				
FLC511	Chinese				
	<b>TOTAL</b>				<b>28</b>

### SIXTH SEMESTER

S. No.	Course Title	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
<b>Elective</b>	<b>Select any ONE</b>			
MCA660	Project Work	-	-	30
MCA661	Internship			

	<b>TOTAL</b>			<b>30</b>
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## COMPUTER PROGRAMMING USING C & C++

Course Code	L	T	P	Credit
MCA101	2	1	0	3

### Course Objective:

This course teaches the student to apply fundamental procedural programming concepts to the programming language C and C++. Programming principles and constructs, such as data types, common control flow structures, basic data structures, and console input/output will be presented.

### Module I: Introduction to C Language

Variables, Identifiers, Data type, Arithmetic operation, constant Relational Logical operators, if statements, if -else, nested if-else statements, Switch, case loop, Do-While, While, for loop and nesting of loop.

### Module II: Arrays and Functions, Pointers

One Dimensional Arrays, Arrays Manipulation, Sorting, Searching, Problems solving Top down Approach, Modular Programming and functions, recursive function. Pointers: Declaration, Pointer assignments, initialization, Pointers and Dynamic Memory Allocation, Discuss Array of Pointers.

### Module III: Structure, Arrays, File Handling and Classes

Structure definition, Declaration, structure Assignments, Arrays in structure, Structure Arrays, Pointer Structure, Nested Structure, Arrays and Arrays of Structure, Union and File Handling.

**Classes and objects:** A simple class, C++ objects as physical objects, Constructors, Destructors, objects as function arguments, returning objects from functions, static class data, array as class data member, array of objects.

### Module IV: Operator Overloading and Inheritance

Overloading unary operator, Overloading binary operator, data conversion.

**Inheritance:** Derived and Base class, Derived class Constructor, types of Inheritance, Abstract base class , public and private Inheritance, Level of Inheritance, Ambiguity in multiple inheritance.

### Module V: Virtual Functions and File Handling

Pointers to objects, virtual functions, friend functions, static functions, this pointer, Files and Streams: streams, string I/O, character I/O, object I/O and file pointer, error handling, and command line arguments.

### Examination Scheme:

Components	Quiz	Presentation	Assignment	Attd	EE
Weightage (%)	5	10	10	5	70

### Text & References:

#### Text:

- Problem Solving through C language, E. Balagurusamy, TMH publication.
- Peter Nortons, "Introduction to Computers", TMH
- Programming with C++, Ravi Chandran
- Mastering C++, Venugopal

#### References:

- Let us C, YashwantKanetkar, BPB Publication.
- P.K. Sinha, "Computer Fundamentals", BPB Publications

# DATABASE MANAGEMENT SYSTEMS

Course Code	L	T	P/FW	CREDITS
MCA102	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 (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, BCNF), Lossless decomposition, Join dependencies, 4<sup>th</sup>& 5<sup>th</sup> 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: TRANSATIONS

**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

Course Code	L	T	P	Credit
MCA 103	2	1	0	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, Virtual Memory Concept, Page Replacement

## 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*, 3<sup>rd</sup> ed. (2009), Prentice-Hall of India Pvt. Ltd.

#### *Reference:*

- Harry & Jordan, *Computer Systems Design & Architecture*, 3<sup>rd</sup> 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*, 2<sup>nd</sup> ed. (2001), Addison Wesley, Delhi

## MATHEMATICAL FOUNDATION TO COMPUTER SCIENCE

Course Code	L	T	P/FW	CREDITS
MCA104	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, proof of identities, Application of set theory, Cartesian product of sets,  $\times$  Relation as Cartesian product of sets, types of relations, Composition of relations, Pictorial representation of relations, equivalence relation, Partial order relation. Definition of function, Types of Functions.

#### Module II

**Algebraic Functions:** Properties, Semi group, Monoid, Subgroup, Group, Abelian group, properties of group, Cyclic group, Permutation group, Homomorphism.

#### Module III

##### Graph Theory and Tree

Basic Terminology, Walks, paths, circuits, connectedness, Handshaking Lemma, Isomorphism, Sub graphs, and Union of Graphs, Reach ability, Eulerian Graph and Union of Graphs, Eulerian Graph, Shortest path problem, Hamiltonian graph, Traveling Salesman Problem, Bipartite graphs. Introduction to trees, Rooted trees, path length in rooted trees, spanning trees, spanning trees of a weighted graph, cut sets and cut vertices, Minimum spanning tree.

#### Module IV

##### Propositional Logic

Proposition, First order logic, Basic Logical operations, Tautologies, Contradictions, Algebra of Proposition. Logical implications and Double implications, Arguments. Mathematical Induction, Recurrence Relation.

#### Module V

##### Combinatorics

Theorem and Binomial Coefficient, Pascal's Triangle, Permutations, Permutation with Repetition, Combinations, Ordered and Unordered Permutations.

### Examination Scheme:

Components			Quiz	Attd	EE
Weightage (%)	10	10	5	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 & C++-LAB

Course Code	L	T	P	Credit
MCA121	0	0	2	1

### List of experiments:

1. Write a program to find the area and perimeter of (i) square (ii) rectangle.
2. Write a Program to find the sum of first n natural numbers.
3. Write a program to calculate the average of n numbers.
4. Write a program to swap the values of two given variables.
5. Write a program to find the square of a given number.
6. Write a program to find the square of a given number.
7. Write a program to calculate the roots of a quadratic equation.
8. Write a program to compute the sum of squares of n natural numbers.
9. Write a program to reverse a given number and also calculate the number of digits in the number.
10. Write a program to calculate the sum of digits of a given number.
11. Write a program to calculate the factorial of a given positive number.
12. Write a program to generate fibonaaci series upto n terms.
13. Write a program to find the GCD and LCM of two given positive numbers.
14. Write a program to print first n prime numbers.
15. Write a program to print
  - if input character is capital,
  - if input character is a lowercase alphabet,
  - if input character is a digit and
  - if some other special character.
16. Write a C program to check whether a number is an Armstrong number.
17. Write a C program to find the power of a number.
18. Write a C program to find the sum of n terms of the series:  $n-n^2/2!+n^3/3!-n^4/4!+.....$
19. Write a C program to find the maximum/minimum number in a given array.
20. Write a C program to search a number in an array using linear search.
21. Write a C program to sort a given array using Bubble sort.
22. Write a C program to concatenate two one-dimensional arrays.
23. Write a C program to add, subtract and multiply two m by n matrices.
24. Write a C program to detect the occurrence of a character in a given string.
25. Write a C program to count the number of characters in a given string with and without using strlen () function.
26. Write a C program to copy the contents of one string to another with and without using strcpy () function.
27. Write a C program to detect the occurrence of a number in a given string.
28. Write a C program to count the number of alphabets in a given string with and without using strlen () function,
29. Write a C program to compare the contents of one string to another with and without using strcmp () function.
30. Write a C program to calculate the factorial of a number using recursion.
31. Write a C program to generate a fibonacci series using recursion.
32. WAP to read a set of numbers in an array & to find the largest of them.
33. WAP to implement bubble sort using arrays.
34. WAP to sort a list of names in ascending order.
35. WAP to read a set of numbers from keyboard & to find sum of all elements of the given array using a function given positive number.
36. WAP to implement bubble sort using functions.
37. WAP to exchange contents of two variables using call by value.

38. WAP to exchange contents of two variables using call by reference.
39. WAP to find the sum of three numbers using pointer to function method.
40. WAP to display content of an array using pointers.
41. Calculate area of different geometrical figures (circle, rectangle, square, triangle) using function overloading.
42. WAP to add two complex numbers using friend function.
43. 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.
44. WAP to increment the employee salaries on the basis of their designation (Manager-5000, General Manager-10000, CEO-20000, worker-2000). Use employee name, id, designation and salary as data member and inc\_sal as member function (Use array of object).
45. 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.
46. WAP to define nested class 'student\_info' which contains data members such as name, roll number and sex and also consists of one more class 'date', whose data members are day, month and year. The data is to be read from the keyboard & displayed on the screen.
47. WAP to generate a series of Fibonacci numbers using copy constructor, where it is defined outside the class using scope resolution operator.
48. Write a class string to compare two strings, overload (==) operator.
49. Write a class to concatenate two strings, overload (+) operator.
50. Create a class item, having two data members x & y, overload '-' (unary operator) to change the sign of x and y.
51. Create a class Employee. Derive 3 classes from this class namely, Programmer, Analyst & Project Leader. Take attributes and operations on your own. WAP to implement this with array of pointers.
52. Create two classes namely Employee and Qualification. Using multiple inheritance derive two classes Scientist and Manager.

### 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

Course Code	L	T	P/FW	CREDITS
MCA122	-	-	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 AND CYBER LAWS

Course Code	L	T	P	Credit
MCA 131	2	1	0	3

### Course Objective:

This course will focus on concepts and methods for providing and evaluating the concept of cyber security in business and personal systems. This course will explore ideas from the viewpoint of cyber security in terms of business risk, individual privacy and role of public policy.

### Course Contents:

#### Module I:

**Introduction to Cyber Security:** Introduction to Cyber Security, Cyber Crime / Social Theories, Threats to security, Government requirements, Information Protection and Access Controls, Computer security efforts, Standards, Computer Security mandates and legislation, Privacy considerations, International, security activity, Intrusion Detection , Malicious Software Use and Detection.

#### Module II: Information Technology Law

The Information Technology Legal Framework in India, Cyber Crime, Digital Evidence, Technological Standards under the Information Technology Law, Liability of companies under the Information Technology Act, Recent amendments by the IT (Amendment Act) 2008, ActSection66(A, B, C, D, E, F), ITActSection67 (A, B, C).

#### Security Investigation:

Legal, Ethical and Professional Issues.

#### Module III: Network Security

Intrusion Detection & Prevention systems, Firewalls and Firewall Policy, Computer Security Log Management, Securing WiMax Wireless Communications.

#### Module IV: Information security

Fundamentals, Employee responsibilities, information classification, Information handling, Tools of information security, Information processing, secure program, administration.

#### Module V: Cyber Attacks

Sniffing & Countermeasures, Brute Force Attack & Countermeasures, IP Spoofing with DOS, Trojan, Backdoor, Virus Countermeasures, Bypassing Proxy & Countermeasures, SQL Injection Attack and Countermeasures, Code Injection & Countermeasures-mail Spoofing, Phishing Countermeasures  
E-mail Security, Network Traffic Analysis.

### Examination Scheme:

Components	Quiz	Presentation	Assignment	Attd	EE
Weightage (%)	5	10	10	5	70

### Text & References:

#### Text:

- Rick Lehtinen and G.T. Gangemi, Computer Security Basics, 2<sup>nd</sup> ed. (2006), O'Reilly Media Inc.

#### References:

- McClure, Stuart & Scambray, Joel, Hacking Exposed 5<sup>th</sup> ed. et al (2005), McGraw-Hill Osborne Media.

# SYSTEM ANALYSIS AND DESIGN

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>MCA132</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>3</b>

## **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:**

<b>Components</b>	<b>CT</b>	<b>HA/V/Q</b>	<b>Attd</b>	<b>EE</b>
<b>Weightage (%)</b>	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

## INTERNET OF THINGS

Course Code	L	T	P	Credit
MCA 133	2	1	-	3

**Module I: Introduction to IoT-** Internet of Things & their characteristics, Design-Physical & Logical design, **IoT Reference Model-** Domain Model, Information Mode, Functional Model, and Communication Model. M2M and IoT technology fundamentals.

**Module II: Sensor Technology-** Introduction to wireless sensor networks, **Sensor nodes-** Sensing and sensors, **Challenges and Constraints, Communication Interfaces-** Protocols, Application of Wireless sensors.

**Module III: Embedded System-** Introduction to embedded systems, Application Areas, Categories of embedded systems, Overview of embedded system, Architecture of embedded systems, Hardware architecture, Software architecture, Application Software, Communication Software.

**Module IV: Domain Specific Application Categories-** Big Data Analytics for IoT, Privacy and Security in IoT, Smart City, Cloud Storage & Computing.

**Module V: Programming & Interfacing-** Open Source Platforms: PIC, Arduino, Sketch and Raspberry Pi. Getting used to Arduino, **Sensor Characterization-** Safety, Basic Electronics (circuit theory, measurements, parts identification). **Sensors and Software-** Understanding Processing Code Structure, variables and flow control, interfacing to the Real World .

### Examination Scheme:

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

### Reference Books:

1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
2. Walteneus Dargie, Christian Poellabauer , "Fundamentals of Wireless Sensor Networks, Theory and Practice", Wiley Series on wireless Communication and Mobile Computing, 2011
3. Arnold. S. Berger, "Embedded Systems Design - An introduction to Processes, Tools and Techniques", Easwer Press, 2001
4. Programming Interactivity, Second Edition By Josha Noble, 2012

## MULTIMEDIA TOOLS – I

Course Code	L	T	P	Credit
MCA134	2	1	-	3

### Course Objective:

The course introduces the students to fundamentals of multimedia tools. Student understands and examines the various elements of multimedia and the associated tools and learns how to use them effectively. The primary objective of this course is to make the student understand the evolution and characteristics of multimedia and further explores the use of multimedia and possible application areas of multimedia. An understanding is provided to the students about the basics of multimedia elements and various associated tools for their creation and manipulation. The student will gain the ability to create and manipulate text, audio, video, and image. This course will focus on some common tools of multimedia and will explore the creative ideas from the viewpoint of Multimedia and its elements.

### Module 1

#### Fundamentals of Multimedia

Evolution of Multimedia, Definition of Multimedia, Characteristics of Multimedia, Uses of Multimedia, Application Areas of Multimedia – print media and electronics publication, education, arts, entertainment and games, e-business, engineering, medical services and scientific research.

### Module 2

#### Elements of Multimedia

Text and its structure – linear and non linear, factors affecting legibility of text, Font vs Typeface, Font effects, types of fonts, advantages and disadvantages of text, hypermedia and hypertext, font editing and designing tools

Introduction to Graphics and Images, Basics of Vector Graphics and Raster Graphics, Image File Formats, Image Editing Tools

Introduction to Sound and Audio, basics of digital audio, MIDI, Audio File Formats, Audio editing tools

Introduction to Video, Analog and Digital Video, Video Standards (NTSC, PAL, SECAM, HDTV), Video File Formats, Video editing tools

Introduction to Animation, Animation Techniques (Traditional, Stop Motion, Mechanical, and Computer), Animation tools

### Module 3

#### Adobe Photoshop CS6 - Basics

Introduction to Photoshop CS6, Setting Up the Document (Page Size, Resolution, Color Mode, Background Contents), Interface Layout, Palettes (Color, Swatches, Style, History, Adjustments, Layers), Toolbar, Selection Tools (Move, Marquee, Lasso, Magic Wand, Crop, Eye Dropper), Alteration Tools (Healing Brush, Brush, Clone Stamp, Art History Brush, Eraser, paint Bucket, Blur), Drawing and Selection Tools (Path Selection, Type, Pen, Line Shape), Additional Tools (Hand, Magnify), Color Boxes and Modes

#### **Module 4**

##### **Adobe Photoshop CS6 - Advanced**

Opening an Image from Disk, Basic Image Editing (Cropping, Resizing, Correcting), Saving a Photoshop File, Transforming Images, Retouching Images, Drawing, Painting, Working with Layers, Applying Filters for Special Effects.

##### **Examination Scheme:**

<b>Components</b>	<b>Attendance</b>	<b>Assignment/ Project/Seminar/Quiz</b>	<b>EE</b>
<b>Weightage (%)</b>	5	25	70

##### **Text Books:**

- Ranjan Parekh, Ranjan, Principles of Multimedia, Tata McGraw Hill Publishing Company Limited
- Dennis Gehris, Using Multimedia Tools and Applications on the Internet, Integrated Media Group, 1998
- Louis Benjamin, Photoshop CS6 in Simple Steps, Pearson Education Limited
- Elizabeth Eisner Reding, Adobe Photoshop CS6 Revealed, Cengage Learning

##### **Reference Books:**

- *Ralf Steinmetz, Multimedia: Computing Communications & Applications, Pearson Education*

## PROBABILITY AND STATISTICAL STRUCTURE

Course Code	L	T	P	Credit
MCA 135	2	1	-	3

### Course Objective:

The aim of the course is to introduce the probability and statistical of theoretical computer science and the theory of statistical analysis. Fundamental concepts in statistical analysis with emphasis on their applications to computer science will be taught.

### Course Contents:

#### Module -I:

Probability: Sample space and events – Probability – The axioms of probability - Some elementary theorems - Conditional probability – Baye's theorem.

#### Module -II:

Random variables – Discrete and continuous – Distribution – Distribution function. Distribution - Binomial, poisson and normal distribution – related properties.

#### Module -III:

Sampling distribution: Populations and samples - Sampling distributions of mean (known and unknown) proportions, sums and differences.

#### Module-IV:

Test of Hypothesis – Means and proportions – Hypothesis concerning one and two means – Type I and Type II errors. One tail, two-tail tests. Tests of significance – Student's t-test, F-test, chi-square test, ANOVA test.

Curve fitting: The method of least squares – Inferences based on the least squares estimations - Curvilinear regression – multiple regressions – correlation for univariate and bivariate distributions.

### Examination Scheme:

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

### TEXT BOOKS:

1. Probability and statistics for engineers:Erwin Miller And John E.Freund. Prentice-Hall of India / Pearson , Sixth edition.
2. Text book of Probability and Statistics by Dr.Shahnaz Bathul, V.G.S.Publishers 2003.

### REFERENCE BOOKS:

1. Probability, Statistics and Random Processes Dr.K.Murugesan & P.Gurusamy by Anuradha Agencies, Deepti Publications.
2. Advanced Engineering Mathematics (Eighth edition), Erwin Kreyszig, John Wiley and Sons (ASIA) Pvt. Ltd., 2001.
3. Probability and Statistics for Engineers: G.S.S.Bhishma Rao,sitech., Second edition 2005.

## INTERNET OF THINGS LAB

Course Code	L	T	P	Credit
<b>MCA 143</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

1. Arduino Installation and Setup Guide
2. Creating REST APIs and Using Them To Send and Receive Sensor Data
  - a. Installing Python
  - b. Installing MongoDB
  - c. Installing Postman (REST API Client)
  - d. Installing Robomongo
  - e. Installing Flask (Python Micro framework)
  - f. Installing Flask\_bcrypt library
  - g. Installing Pymongo library
3. Installing REST APIs
  - a. App.py
  - b. IoT API
  - c. IoT Endpoint API
  - d. Models.py
4. Data Analytics
  - a. Insert Sample Data in MongoDB
  - b. To Insert Data to Database from a Local File
  - c. Performing MapReduce
  - d. Creating a Web Service to Fetch Data from Mongo DB
  - e. Performing Visualization on Fetched Data
5. Demonstrate the working of Embedded Programming Class.
6. Demonstrate the working of Sensor Calibrations and Usage.
7. Demonstrate the working of Protocol Implementations.
8. Demonstrate the working of Java/Python Programming Class.
9. Demonstrate the working of Big Data Programming Class.
10. Demonstrate the working of Analytics Programming Class.
11. Demonstrate the working of Web Services Programming Class.
12. Demonstrate the working of Cloud based Application Development.
13. Demonstrate the working of C Programming Class.
14. Demonstrate the working of Arduino/Raspberry Pi Programming Class.

### 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.

## MULTIMEDIA TOOLS– I LAB

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>MCA 144</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>1</b>

Practical 1 : Creating a basic Photoshop File and saving it.

Practical 2 : Correcting Backlight of an Image.

Practical 3 : Brightening Specific Spot in an Image.

Practical 4 : Mixed Black and White with Colors

Practical 5 : Enhancing Portraits – Removing Red Eye

Practical 6 : Removing Facial Blemishes / Mole

Practical 7 : Removing White Background on Logo and Turn into Transparent Image

Practical 8 : Cropping an Object

Practical 9 : Clean Background

Practical 10 : Bokeh Effect / Blur Background

Practical 11 : Zooming Effect In Picture

Practical 12 : Watermark Using Actions

Practical 13 : Panorama

Practical 14 : Mass Image Editing Using Photoshop Actions

Practical 15 : Download font at [www.1001freefonts.com](http://www.1001freefonts.com)

Practical 16 : Text Effects

Practical 17 : Create a banner

Practical 18 : Photoshop HDR

Practical 19 : Replacing Colour

### Examination Scheme:

<b>IA</b>				<b>EE</b>	
<b>A</b>	<b>PR</b>	<b>LR</b>	<b>V</b>	<b>PR</b>	<b>V</b>
5	10	10	5	35	35

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

## PROBABILITY AND STATISTICAL STRUCTURE LAB

Course Code	L	T	P	Credit
MCA 145	-	-	2	1

### INSTRUCTIONS TO STUDENTS

1. Students should be regular and come prepared for the lab practice.
2. In case a student misses a class, it is his/her responsibility to complete that missed experiment(s).
3. Students should bring the observation book, lab journal and lab manual. Prescribed textbook and class notes can be kept ready for reference if required.
4. They should implement the given experiment individually.
5. While conducting the experiments students should see that their programs would meet the following criteria:
  - Programs should be interactive with appropriate prompt messages, error messages if any, and descriptive messages for outputs.
  - Programs should perform input validation (Data type, range error, etc.) and give appropriate error messages and suggest corrective actions.
  - Comments should be used to give the statement of the problem and every function should indicate the purpose of the function, inputs and outputs
  - Statements within the program should be properly indented
  - Use meaningful names for variables and functions.
  - Make use of Constants and type definitions wherever needed.
6. Once the experiment(s) get executed, they should show the program and results to the instructors and copy the same in their observation book.
7. Questions for lab tests and exam need not necessarily be limited to the questions in the manual, but could involve some variations and / or combinations of the questions.

### LAB CONTENTS

SL NO.	TITLE OF EXPERIMENT	WEEKS
1.	<b>Frequencies</b> analysis	
2.	<b>Descriptive</b> analysis	
3.	<b>Crosstabs</b> analysis	
4.	<b>One Sample t – Test</b> analysis	
5.	<b>Independent Sample t – Test</b>	
6.	<b>Paired Sample t – Test</b> analysis	
7.	<b>One-Way ANOVA</b> analysis	
8.	<b>Chi – Square Test</b> analysis	
9.	correlation analysis	
10.	<b>Multiple Regression</b> analysis	

#### AIM:

To practice **Entering the Data** in SPSS

#### PROCEDURE:

Step 1: Go to **All programs → SPSS → SPSS statistics** and click to open SPSS main window.

Step 2: Go to **File → Open → Data** to open the data sheet.

Step 3: It will ask for the destination to store the file. Select the destination folder in the computer and name the document and click on save to save the statistics document file.

Step 4: Go to variable screen from the bottom toolbar of the sheet.

Step 5: Type the **Variable Name, Type, Width, Decimal Points required and other required information** to create the variable.

Step 6: Use the same procedure for creates the required data variables.

Step 7: Go to data view table and type the data on the variable in the sheet.

### **RESULT:**

Data have been stored in the table.

## **Experiment No. 1 (DESCRIPTIVE STATISTICS)**

### **Experiment No. 1a (FREQUENCIES)**

#### **AIM:**

To make **Frequencies** analysis using SPSS

#### **PROCEDURE:**

Step 1: Open the SPSS datasheet and feed the data as per the instruction given in Experiment No. 1

Step 2: Click **Analyze** to get the sub – menu.

Step 3: Now click **Descriptive Statistics → Frequencies** from the **Analyze** sub – menu.

Step 4: Select the **Variable1** from frequency table and take it to the **Variable(s)** list box by clicking ↵ button.

Step 5: Keeping all other options unchanged, click **OK** to execute command.

Step 6: The output will be published in a new window.

#### **RESULT:**

**Descriptive Statistics (Frequencies)** is conducted and the result is identified.

## **Experiment No. 2 (DESCRIPTIVES)**

#### **AIM:**

To make **Descriptive** analysis using SPSS

#### **PROCEDURE:**

Step 1: Open the SPSS datasheet and feed the data as per the instruction given in Experiment No. 1

Step 2: Click **Analyze → Descriptive Statistics → Descriptives**

Step 3: Holding Shift Key (or) Ctrl Key to select **Variable** and move them into the **Variable(s)** list box by clicking ↵ button.

Step 4: Click the **Options** button to get the dialogue box.

Step 5: Select the desired statistics by clicking the appropriate check boxes. **Minimum, Maximum, Mean and Standard Deviation** are selected by default. Here, we shall keep the default selection of statistics.

Step 6: Keeping default value for **Display Order** → click the **Continue** button to go back to the previous dialogue box → click the **OK** button to execute the command.

Step 7: Following output shall be displayed in the Output Viewer Window

#### **RESULT:**

You see the title **Descriptives** followed by the **Descriptive Statistics** table and the result is identified.

### **Experiment No.3 (CROSSTABS) [an observation of Cross-tabulation]**

#### **AIM:**

To make **Crosstabs** analysis using SPSS

#### **PROCEDURE:**

Step 1: Open the SPSS datasheet and feed the data as per the instruction given in Experiment No. 1

Step 2: Click **Analyze → Descriptive Statistics → Crosstabs**

Step 3: Select **Variable1** and move it to the **Rows** list box and select **Variable2** and move it to the **Columns** list box.

Step 4: Click the **Cells** button to get the dialogue box.

Step 5: This allows you to add additional values to your table. Click the check box to select **Observed, Expected** in the **Counts** frame; and the **Row, Column and Total** in the **Percentage** frame.

Step 6: Click the **Continue** button to go back to the previous dialogue box → and then click the **OK** button to execute the command.

Step 7: Following output shall be displayed in the Output Viewer Window

#### **RESULT:**

The output will display a heading **Crosstabs** followed by two tables – **Case Processing Summary** and **Variable1 \* Variable2 Cross-tabulation** and the result is identified.

### **Experiment No.4**

#### **(HYPOTHESIS – PARAMETRIC)**

#### **Experiment No. 2a (One Sample t-Test):**

When sample is less than 30 and population standard deviation is not known, t-distribution is used instead if standard normal distribution. The dataset for our example of bulb life as claimed by the manufacturer is shown in the following table: ( $H_0: \mu = 3000$  &  $H_1: \mu \neq 3000$ )

<b>Users</b>	<b>Bulb life</b>	<b>Users</b>	<b>Bulb life</b>
1	2789	6	2600
2	2800	7	2895
3	2300	8	3175
4	3100	9	2500
5	2750	10	2400

#### **AIM:**

To make **One Sample t – Test** analysis using SPSS

#### **PROCEDURE:**

Step 1: Enter data given in the table above in the data editor and save it as **bulblife.sav**.

Step 2: Click **Analyze** to get the sub – menu.

Step 3: Now click **Compare Means → One-Sample t-Test** from the **Analyze** sub – menu. A dialogue box appears;

Step 4: Select the variable **Bulb-Life (in hours)** and move it in the **Test Variable(s)** box by clicking ↵ button.

Step 5: Type the hypothesized population mean value (in our example, **3000**) in the **Test Value** box.

Step 6: Click **OK** button to execute command.

Step 7: The output will be published in a new window.

#### **RESULT:**

You will see the title **t-Test** followed by two tables – **One Sample Statistics & One Sample Test** and the result is identified.

#### **Experiment No. 5 (Independent Sample t-Test):**

##### **AIM:**

To make **Independent Sample t – Test** analysis using SPSS

##### **PROCEDURE:**

Step 1: Open the SPSS datasheet and feed the data as per the instruction given in Experiment No. 1

Step 2: Click **Analyze** to get the sub – menu

Step 3: Now click **Compare Means** → **Independent Sample t–Test** from the **Analyze** sub – menu to get the dialogue box;

Step 4: Select the Variable and move it in the **Test Variable(s)** box by clicking ↵ button.

Step 5: Click **Define Groups** → assign code **0** to **Group1** and **1** to **Group 2** → and click **Continue** button to return to previous dialogue box.

Step 6: Click the **Options** button to select the **Confidence Interval**. The dialogue box will appear;

Step 7: Since the chosen value of  $\alpha$  is 0.05, we keep the value of **Confidence Interval** of **95%**.

Step 8: Click **Continue** and the **OK** button to execute the command.

Step 9: The output will appear in the output viewer window.

##### **RESULT:**

You see the title **t-Test** followed by two tables – **Group Statistics & Independent Sample Test** and the result is identified

#### **Experiment No. 6 (Paired Sample t-Test):**

##### **AIM:**

To make **Paired Sample t – Test** analysis using SPSS

##### **PROCEDURE:**

Step 1: Open the SPSS datasheet and feed the data as per the instruction given in Experiment No. 1

Step 2: Click **Analyze** to get the sub – menu

Step 3: Now click **Compare Means** → **Paired Sample t–Test** from the **Analyze** sub – menu to get the dialogue box;

Step 4: Holding Shift Key (or) Ctrl Key to select two variables and shift them to **Paired Variable(s)** list box by clicking ↵ button in the centre.

Step 5: Click **Options** button to get the dialogue box.

Step 6: Keeping the default value of **Confidence Interval Percentage** → click **Continue** button to go to the previous dialogue box → and then click **OK** to execute command.

Step 7: The output will appear in the output viewer window.

##### **RESULT:**

The output displays three tables – **Paired Samples Statistics, Paired Samples Correlations & Paired Sample Test** under the title **t-Test** and the result is identified.

#### **Experiment No. 7 (One-Way ANOVA):**

##### **AIM:**

To make **One-Way ANOVA** analysis using SPSS

##### **PROCEDURE:**

Step 1: Open the SPSS datasheet and feed the data as per the instruction given in Experiment No. 1

Step 2: Click **Analyze** to get the sub – menu

Step 3: Now click **Compare Means** → **One-Way ANOVA** from the **Compare Means** menu to get the dialogue box;

Step 4: Select and bring the **variable1** to the **Dependent List** box and Select **variable2** and bring it to the **Factor Text** box by clicking ↵ button in the centre.

Step 5: Click **Options** button to get the dialogue box.

Step 6: Select **Descriptive, Homogeneity of variance test** and **Means plot** → click **Continue** button to go to the previous dialogue box → and then click **OK** to execute command.

Step 7: In the output viewer window, table for the descriptives and ANOVA will be displayed

### **RESULT:**

The output displays three tables – **Descriptives, Test of Homogeneity of Variances & ANOVA** - under the title **One-way**, and one graph under the title **Means Plot** and the result is identified.

### **Experiment No. 8 (Chi – Square Test)**

#### **AIM:**

To make **Chi – Square Test** analysis using SPSS

#### **PROCEDURE:**

Step 1: Open the SPSS datasheet and feed the data as per the instruction given in Experiment No. 1

Step 2: Click **Analyze** to get the sub – menu

Step 3: Click **Descriptive Statistics** → **Crosstabs** to get the dialogue box.

Step 4: Select **Variable1** and move it to the Rows list box and select **Variable2** and move it to the Columns list box.

Step 5: Click **Statistics** button to get the dialogue box.

Step 6: This allows you to add additional values to your table. Click the check box to select **Chi-Square** → click **Continue** to return to the previous dialogue box.

Step 7: Keeping all other options unchanged, click **OK** button to execute the command.

Step 8: The output will be appear in output viewer window.

### **RESULT:**

Three tables – **Case Processing Summary** and **Variable1 \* Variable2 Cross-tabulation** and **Chi-Square Tests** – are generated under the heading **Crosstabs** on executing the command for Chi-square test and the result is identified.

### **Experiment No.9**

#### **(CORRELATION & REGRESSION)**

#### **Experiment No. 4a (Correlations)**

#### **AIM:**

To make correlation analysis using SPSS

#### **PROCEDURE:**

Step 1: Open the SPSS datasheet and feed the data as per the instruction given in Experiment No.1

- Step 2: Click **Analyze** to get the sub – menu
- Step 3: Click **Correlate** → **Bivariate** to get the dialogue box.
- Step 4: Holding Shift Key (or) Ctrl Key to select two or more variables and move these variables to the **Variables** box by clicking ↵ button in the centre.
- Step 5: Click **Options** button to get the dialogue box.
- Step 6: To find out **Means and standard deviations** for each of the selected variables, select appropriate check boxes in the **Statistics** frame.
- Step 7: Click **Continue** button to go back to the previous dialogue box and keeping all other options unchanged.
- Step 8: Click **OK** to execute the command.
- Step 9: The output will be appear in output viewer window.

**RESULT:**

Under the major heading – **Correlations**, a table titled Correlations is displayed and the result where identified.

**Experiment No. 10 (Regression)**

**AIM:**

To make **Multiple Regression** analysis using SPSS

**PROCEDURE:**

- Step 1: Open the SPSS datasheet and feed the data as per the instruction given in Experiment No.1
- Step 2: Click **Analyze** to get the sub – menu
- Step 3: Click **Regression** → **Linear** to get the dialogue box.
- Step 4: Select **Variable1** and move it to **Dependent** text box and holding Shift Key (or) Ctrl Key to select two or more **Variables** and bring these variables to the **Independent(s)** list box by clicking ↵ button in the centre.
- Step 5: Keeping other options unchanged → click **OK** button to execute command.
- Step 6: The output will be appear in output viewer window.

**RESULT:**

Under the title **Regression**, four tables – **Variables Entered and Removed, Model Summary, ANOVA** and **Coefficients** – will be displayed and the result where identified.

**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 AND FILE STRUCTURES USING 'C'

Course Code	L	T	P	Credit
MCA201	2	1	-	3

### 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  $k^{\text{th}}$  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

Course Code	L	T	P	Credit
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 NETWORKING

Course Code	L	T	P	Credit
MCA203	2	1	-	3

### 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

Course Code	L	T	P	Credit
MCA204	2	1	-	3

## 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.

### 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, Weddle's rule.

### Module VI: Numerical Solution to ODE

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

## Examination Scheme:

Components	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	10	10	5	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.
- B.S.Grewal, Numerical method for engineer, Khanna Publication.

## DATA AND FILE STRUCTURES USING 'C' LAB

Course Code	L	T	P	Credit
MCA 221	-	-	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 k<sup>th</sup> element of an array.
7. Write a program to insert an element at the k<sup>th</sup> 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:**

<b>IA</b>				<b>EE</b>	
<b>A</b>	<b>PR</b>	<b>LR</b>	<b>V</b>	<b>PR</b>	<b>V</b>
5	10	10	5	35	35

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

## OPERATING SYSTEM LAB

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
MCA222	-	-	2	1

### Course Contents:

Assignment No.	Topic	Activity
<b>1</b>	<b>CPU Scheduling Algorithms</b>	1. Write a C program to simulate the following non-preemptive CPU scheduling algorithms to find turnaround time and waiting time. a) FCFS b) SJF c) Round Robin (pre-emptive) d) Priority 2. Write a C program to simulate multi-level queue scheduling algorithm considering the following scenario. All the processes in the system are divided into two categories – system processes and user processes. System processes are to be given higher priority than user processes. Use FCFS scheduling for the processes in each queue.
<b>2</b>	<b>File Allocation Strategies</b>	Write a C program to simulate the following file allocation strategies. a) Sequential b) Indexed c) Linked
<b>3</b>	<b>Memory Management Techniques</b>	*Write a C program to simulate the MVT and MFT memory management techniques. *Write a C program to simulate the following contiguous memory allocation techniques a) Worst-fit b) Best-fit c) First-fit *Write a C program to simulate paging technique of memory management.
<b>4</b>	<b>File Organization Techniques</b>	*Write a C program to simulate the following file organization techniques a) Single level directory b) Two level directory c) Hierarchical
<b>5</b>	<b>Deadlock Management Techniques</b>	*Write a C program to simulate Bankers algorithm for the purpose of deadlock avoidance. *Write a C program to simulate disk scheduling algorithms a) FCFS b) SCAN c) C-SCAN
<b>6</b>	<b>Page Replacement Algorithms</b>	*Write a C program to simulate page replacement algorithms a) FIFO b) LRU c) LFU *Write a C program to simulate page replacement algorithms a) Optimal
<b>7</b>	<b>Process Synchronization</b>	*Write a C program to simulate producer-consumer problem using semaphores. *Write a C program to simulate the concept of Dining-Philosophers problem

### Examination Scheme:

<b>IA</b>				<b>EE</b>	
<b>A</b>	<b>PR</b>	<b>LR</b>	<b>V</b>	<b>PR</b>	<b>V</b>
5	10	10	5	35	35

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

## MANAGEMENT INFORMATION SYSTEM

Course Code	L	T	P	Credit
MCA 231	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 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 IV: 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

## CYBER FORENSIC

Course Code	L	T	P	Credit
MCA 232	2	1	-	3

### Course Objective:

The objective of this course is to provide identification, preservation, and extraction of electronic evidence, auditing and investigation of network and host system intrusions, analysis and documentation of information gathered, and preparation of expert testimonial evidence.

### Course Contents:

#### Module I: Computer Forensics Fundamentals

Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Stages of forensic investigation: Types of Computer Forensic Technology, Military, Law Enforcement, Business, Specialized Forensic Techniques; Types of Computer Forensics Systems: Internet Security, Intrusion Detection, Firewall Security, Public Key Infrastructure, Net Privacy, Identity Theft, Biometric Security Systems; .Data Recovery :Data Backup,- Recovery and Solution, Hiding and Recovering Hidden Data, Evidence Collection and Data Seizure, Types of Evidence: General Procedure, Collection and Archiving,

#### Module II: Mobile Forensics

Crime and mobile phones, evidences, forensic procedures, files present in SIM card, device data, external memory dump and evidences in memory card, operators systems Android forensics: Procedures for handling an android device, imaging android USB mass storage devices, logical and physical techniques.

#### Module III: Network Forensics

Collecting Network Based Evidence - Investigating Routers - Network Protocols - Email Tracing - Internet Fraud.

#### Module IV: Analysis of Digital Forensic Techniques

Digital forensics examination principles: Previewing, imaging, continuity, hashing and evidence locations- Seven element security model- developmental model of digital systems- audit and logs- Evidence interpretation: Data content and context.

### Examination Scheme:

Components	CT1	CT2	A/C/Q	Attd	EE
Weightage (%)	10	10	05	5	70

### Text & References:

#### Text:

- Skoudis.E, Perlman. R. Counter Hack: “A Step-by-Step Guide to Computer Attacks and Effective Defenses”, .Prentice Hall Professional Technical

#### References:

- Eoghan Casey, "Handbook Computer Crime Investigation's Forensic Tools and Technology", Academic Press, 1st Edition, 2001.
- Norbert Zaenglein, “Disk Detective: Secret You Must Know to Recover Information From a Computer”, Paladin Press, 2000.

## E-COMMERCE AND SECURE TRANSACTIONS

Course Code	L	T	P	Credit
MCA233	2	1	-	3

**COURSE OBJECTIVE:** The course introduces the students to the concept of E-commerce and its benefits and limitations in our everyday lives. The course also provides information on the basic concept and definitions of E-commerce, understanding E-commerce and E-business, techniques and methodologies for E-commerce websites, product catalogues, processing order, managing a shopping cart and finally completing the purchasing process and tracking shoppers' information

### Module 1 – Overview of E-Commerce

Brief Overview and various terminologies associated with E-Commerce, Categories of E-Commerce with their pros and cons, infrastructure for E-Commerce, Electronic Payment System and development of Online Bank, Advantages and Disadvantages of E-Commerce.

### Module 2 – Constitution of E-Commerce

e-Supply Chain Management – Introduction, SCM versus e-SCM, Stakeholders, Supply Chain Management Flow, Advantage of e-SCM, case study on e-SCM Adoption by various Business Sectors.

e-Customer Relationship Management – Introduction, CRM versus e-CRM, Lifecycle of e-CRM, Advantage of e-CRM, case study on e-CRM Adoption by various Business Sectors.

### Module 3 – Security Technologies and Management in E-Commerce

Security Problems in E-Commerce, Reliability of E-Commerce System, Data Encryption Technology, Digital Signature, Authentication Technology, Firewall Technology, Intrusion Detection Technology, Secure Payment Technology, Legal Problems in E-Contract, E-Banks, Electronic Fund Transfer, Intellectual Property Protection in E-Commerce, Legal Problems of E-Commerce Security, Consumer Rights Protection in E-Commerce, Legal Liability in E-Commerce.

### Module 4 – Portal Site Design of Virtual Enterprises

E-Commerce and Portal Site, Online Virtual Shop, Design Method of Product Catalog and Online Shopping Cart, E-Commerce and International Trade.

### Examination Scheme:

Components	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	5	25	70

### Text Book:

- V. RAJARAMAN. ESSENTIALS OF E-COMMERCE TECHNOLOGY. PHI, 2010.
- Kalakota, Ravi, and Andrew B. Whinston. *Electronic commerce: a manager's guide*. Addison-Wesley Professional, 1997.
- Jerry Fjermestad, and Nicholas C Robertson Jr., *Electronic Customer Relationship Management*, Routledge, Taylor & Francis Group, ISBN: 9780765613271.

- David F. Ross, Introduction to e-Supply Chain Management- Engaging Technology to Build Market – Winning Business Partnership, CRC Press.

**Reference Book:**

- Chaudhury, Abhijit, and Jean-Pierre Kuilboer. *E-business and E-commerce Infrastructure: Technologies Supporting the E-business Initiative*. McGraw-Hill Higher Education, 2001.
- Nabil R. Adam, et al., *Electronic Commerce: Technical, Business, and Legal Issues*. Prentice Hall, 1998.
- Ali Jafari and Mark Sheehan, *Designing Portals: Opportunity and Challenges*. IRM Press, 2003.
- Andreas Meier and Henrik Stromer. *eBusiness & eCommerce Managing the Digital Value Chain*. Springer, 2009.
- Henry Chan, Raymond Lee, and Tharam Dillon. *E-Commerce, Fundamentals And Applications*. Wiley India, 2001.
- Hossein Bidgoli. *Electronic Commerce: Principles and Practice*. Academic Press, 2002.

# INFORMATION SECURITY

Course Code	L	T	P	Credit
MCA 234	2	1	-	3

## Course Objective:

This course will focus on concepts and methods for providing and evaluating security in information processing systems. This course will explore ideas from the viewpoint of security of information in terms of business risk, individual privacy and role of public policy.

## Course Contents:

### Module I: Introduction

History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The Security SDLC.

### Module II: Security Investigation

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues.

### Module III: Security Analysis

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk.

### Module IV: Logical Design

Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS7799, Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS7799, Design of Security Architecture.

### Module V: Physical Design

Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel.

## Examination Scheme:

Components	Quiz	Presentation	Assignment	Attd	
Weightage (%)	5	10	10	5	

## Text & References:

### Text:

- Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003
- 2. Micki Krause, Harold F. Tipton, " Handbook of Information Security Management", Vol 1-3 CRC Press LLC, 2004

# MAT LAB

Course Code	L	T	P	Credit
MCA 235	2	1	-	3

## Course Objective:

The availability of technical computing environment such as MATLAB is now reshaping the role and applications of computer laboratory projects to involve students in more intense problem-solving experience. This availability also provides an opportunity to easily conduct numerical experiments and to tackle realistic and more complicated problems.

## Course Contents:

### Introduction

Basic Features, Starting MAT Lab, Using MAT Lab, Quitting Mat lab, Creating MATLAB variables, Overwriting variable, Error messages, Making corrections, Managing the workspace, Keeping track of your work session, Entering multiple statements per line.

### Basic Plotting

overview, Creating simple plots, Adding titles, axis labels, and annotations, Multiple data sets in one plot, Specifying line styles and colors, Matrix generation.

### Array operations and Linear equations

Array operations , Matrix arithmetic operations, Array arithmetic operations ,Solving linear equations, Matrix inverse.

### Introduction to programming in MATLAB

Introduction, M-File Scripts, Script side-effects, M-File functions, Anatomy of a M-File function, Input and output arguments, Input to a script file.

### Control Flow and operators

Introduction, Control Flow, The ``if...end" structure , Relational and logical operators , The ``for...end" loop , The ``while...end" loop, Other Flow structures , Operator precedence

### Debugging M-Files

Introduction , Debugging process, Preparing for debugging , Setting breakpoints, Running with breakpoints , Examining values, Correcting and ending debugging, Ending debugging, Correcting an M-File . .

## Examination Scheme:

Components	CT	A/Q	Attd	EE
Weightage (%)	15	05	5	70

## MULTIMEDIA TOOLS – II

Course Code	L	T	P	Credit
MCA 236	2	1	-	3

**Course Objective:** The course introduces the students to Flash software tool for creating basic animation and programming using action script. Student examines the various aspects of flash tool learns how to use them effectively for creating animations and controlling it during run time using programming. The primary objective of this course is to make the student understand the fundamental aspects of animation through the implementation of Flash tool and also explores the programming side of flash using action script. The student will gain the ability to create simple animation and interactive animation and website. This course will focus on Flash tool and will explore the creative ideas from the viewpoint of Multimedia.

### Module 1

**Introduction to Flash:** Introduction to Flash, Feature 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 2

**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 3

**Scripting in Flash :**Introduction, Understanding Action Script, Action Script uses OOP, Variables and Data Types, Basic Action – Introduction, How to go to a frame & scene, playing & stopping movies, mouse events, Conditional Statements.

### Module 4

**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	Attendance	Assignment/ Project/Seminar/Quiz	EE
Weightage (%)	5	25	70

### Text Books:

- Alec Fehl, Adobe Flash CS6: Introductory, Cengage Learning
- William Heldman, Adobe Flash Professional CS6 Essentials, John Wiley & Sons Inc.

### Reference Books:

- Adobe Creative Team, Adobe Flash Professional CS6 Classroom in a Book, ISBN: 978-0-321-82251-2

## INFORMATION SECURITY LAB

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>MCA 244</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>1</b>

1. Learn to install wine / virtual box or any other equivalent software on the host os.
2. Perform an experiment to grab a banner with telnet and perform the task using netcat utility.
3. Perform an experiment for port scanning with nmap, superscan or any other software.
4. Using nmap
  - 1)find open ports on a system
  - 2) find the machines which are active
  - 3)find the version of remote os on other systems
  - 4)find the version of s/w installed on other system
5. Perform an experiment on active and passive finger printing using xprobe2 and nmap.
6. Perform an experiment to demonstrate how to sniff for router traffic by using the tool wireshark.

### Examination Scheme:

<b>IA</b>				<b>EE</b>	
<b>A</b>	<b>PR</b>	<b>LR</b>	<b>V</b>	<b>PR</b>	<b>V</b>
5	10	10	5	35	35

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

## MATLAB LAB

Course Code	L	T	P	Credit
MCA 245	-	-	2	1

### 1. Course summary

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 operations of MATLAB and learning 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.

### 2. Course aims

- 1) To impart basic knowledge of MATLAB.
- 2) To study the MATLAB operations and coding.
- 3) To develop the concept of search Analysis and Knowledge representation through logic.

### 3. learning outcomes

**After completion of the course the student will be able to**

- 1) Understand the basics of MATLAB.
- 2) Solve the problems under analysis like heuristic search etc.,
- 3) To Programme how to analyze the error concepts and their importance.
- 4) Apply different types of logics and their procedures for problem solving.
- 5) Solve complex problems using knowledge.
- 6) Understand what exact the Uncertainty learning is.

### 4. Course Contents:

1. Characteristics of MATLAB
2. Introduction to MATLAB
3. Understand the graphical interface to the MATLAB workspace.
4. Getting started with MATLAB by creating variables, Arithmetic operations etc.,
5. Executing the Mathematical expressions.
6. Creating simple plots.
7. Matrix Generation.
8. Array Operations and linear equation with MATLAB
9. Basic Programming with MATLAB
10. Debugging M- Files

## 5. Assessment

### 5.1 Assessment tasks

Assessment task	Length	Weight	Mark	Due date
<b>Assessment 1:</b> Lab Assignment I	3week	5	5	End of the First Month
<b>Assessment 2:</b> Lab Test	1 hour	15	15	End of the Second Month
<b>Assessment 3:</b> Lab Assignment II	3 week	5	5	End of the Third month
<b>Assessment 4:</b> Attendance	Weekly	5	5	Weekly
<b>Assessment 5:</b> End-Semester Examination	2 hours	70	70	End of 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.

### General Guidelines for the students-

1. It is expected from all students to be present in all lab sessions. But due to some to some unavoidable circumstances, he/ she has to be present in at least 75% lab sessions, otherwise student will be debarred from the examination.
2. Students have to bring their practical record in the lab otherwise attendance will not be given to them.
3. They have to submit the practical record with the practical (that has been performed during previous lab session) written on it, on the day of next practical.
4. Students have to maintain the decorum of the Lab.

## MULTIMEDIA TOOLS– II LAB

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>MCA 246</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>1</b>

Practical 1 procedure to create an animation to represent the growing moon.

Practical 2 procedure to create an animation to indicate a ball bouncing on steps.

Practical 3 procedure to simulate movement of a cloud.

Practical 4 procedure to draw the fan blades and to give proper animation

Practical 5 procedure to display the background given (filename: tulip.jpg) through your name

Practical 6 procedure to create an animation with the following features.

Welcome \* letters should appear one by one

\* the fill colour of the text should change to a different colour after the display of the full word

Practical 7 procedure to simulate a ball hitting another ball

Practical 8 procedure to create an animated cursor using `startdrag("ss", true); mouse.hide();`

Practical 9 procedure to implement motion guide layer.

Practical 10 procedure to implement shape tweening.

### Examination Scheme:

<b>IA</b>				<b>EE</b>	
<b>A</b>	<b>PR</b>	<b>LR</b>	<b>V</b>	<b>PR</b>	<b>V</b>
5	10	10	5	35	35

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

## REPORT ON INDUSTRY VISIT

Course Code	L	T	P	Credit
MCA 251	-	-	-	1

### Course Objective:

In order to gain practical knowledge, students are expected to visit at least one organization (Industries) of relevant fields during their course duration. The purpose of the industrial visit is to provide the student with an incremental learning experience where they get an insight into how the work is being carried out in the industry. Industry visits bridge the gap between theoretical training and practical learning in a real-life environment. Industry visits provide opportunity for active/interactive learning experiences in-class as well outside the classroom environment. With industry visits, students are able to better identify their prospective areas of work in the overall organizational function. Industry visits help enhance interpersonal skills and communication techniques. Students become more aware of industry practices and regulations during industry visits. Industry visits broaden the outlook of students with exposure to different workforces from different industries.

### Rules and Regulations for Industrial Visits

- Industrial Visit can be organized for 2<sup>nd</sup> Year / 3<sup>rd</sup> Year Students for which the students and the faculty members can start preparations two / three months prior to the scheduled industrial visit.
- The number of students going for any Industrial Visit should not exceed 50, to make it manageable.
- Through a diligent process which includes communicating to the potential companies a proper consent letter should be obtained from the organisation / industry scheduled for visit with following key information:
  - The procedure for arrivals on site
  - Key health and safety issues
  - Instructions on acceptable behaviour
  - Any rules about dress code, suitable clothing and footwear
  - Restrictions on watches, piercings, earrings and other jewellery
  - Any restrictions related to bringing or consuming food and drink on the site
- A proposal for the proposed Industrial Visit should be drafted and presented to the HoI reflecting the following key points:
  - Entire activity plan
  - Route Map
  - What are the objectives of the Industrial Visit for the students?
  - What they need to learn, do, and prepare before the students visit the organisation?
  - List of prospective students with Contact Details
  - List of Faculty Coordinators with Contact Details
  - Case of approval of transport
  - Requisition for advance for money
- After getting approval from the HoI, a note sheet should be prepared and all necessary permission and approval from the competent authorities should be obtained.

- The attention and co-operation of all students and parents are requested to conduct the industrial visit most effectively. Signing of the letter of Indemnity Bond (Consent-cum-Undertaking) is mandatory for all the parents of students going for Industrial Visit in or outside Jaipur. A medical fitness certificate is also to be submitted along with the Indemnity Bond/Undertaking. Duly executed Indemnity Bond should be submitted to HoI Office at least 2 days prior to the visit, without which the accompanying Staff coordinator shall not permit the student to participate in the industrial visit
- The list of students participating in an Industrial Visit shall be handed over to the concerned HODs, Staff coordinators.
- The students need to be accompanied by the faculty members of the college. (Minimum one senior faculty amongst a group of three faculties.)(Ratio need to be maintained: - 20 students : 1 faculty).
- Faculty Coordinator(s) and Students should be present in formals.
- Faculty Coordinator(s) and Student Coordinator(s) need to ensure that all the students carry the College Identity Cards during their journey.
- During Industrial Visit, the students needs to be divided into smaller groups and the group leader has to be decided amongst them who will be responsible for taking care all the group members. The group leader will be in touch with the accompanying faculty member(s) for any issues.
- Going to restricted areas and not following the instructions of the Group Leaders/ Heads/ Faculties will be treated as a serious disobedience even though they have signed the bond.
- Use of alcohol/ drugs and smoking etc are not allowed and strict action will be taken against the students involved in such activities.
- Meeting with Relatives is not allowed in the course of the Industrial Visit. All students need to be in the group at all times during the Industrial Visit till they return to the destination.
- In case of illness during the Industrial Visit, students can be sent back to Mumbai by the concerned faculties.
- Discipline should be maintained both in industry and public. Students should behave in a very decent manner. Any violation will be viewed very seriously. Good behaviour by students throughout the Industrial Visit is expected as the name of the Institute / University is attached with the students.
- The acknowledgement from the industry has to be taken (Students and faculty) after that particular visit is done.
- A report of the Industrial Visit is to be submitted in 5 days time by students / faculty coordinators once the students are back.

The report to be prepared should reflect the following:-

- What happened at the organisation / industry the students visited and how does it relate in the best way to the preparations and the learning objectives.
- How do the students and the faculty members will use the industrial visit after it is over?
- What will they gain from it and how can they set up activities that transfer the experience into learning?
- Evaluation parameters for the success of the experience of Industrial Visit.

## **The layout guidelines for the 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

## **ASSESSMENT OF THE INDUSTRY VISIT FILE**

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Report 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.

### **Examination Scheme:**

<b>Components</b>	<b>V</b>	<b>S</b>	<b>R</b>	<b>FP</b>
<b>Weightage (%)</b>	20	20	20	40

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

## OPTIMIZATION TECHNIQUES

Course Code	L	T	P	Credit
MCA 301	2	1	-	3

### 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..

#### Module V: Queueing Models

Markovian queues – Birth and Death processes – Single and multiple server queueing models (M/M/1 & M/M/S) – Little's formula – Queues with finite waiting rooms – Queues with impatient customers: Balking and reneging.

#### 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	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	10	10	5	5	70

### Text & References:

#### *Text:*

- Operations Research, J K Sharma, Macmillan Publication

#### *References:*

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

## CORE JAVA

Course Code	L	T	P	Credit
MCA302	2	1	-	3

### Course Objective:

This course will introduce the architecture of java programming. At the same time it provides the detail information Java programming concepts like classes, inheritance, packages, exception handling, file handling and applet programming. This course also includes GUI components, AWT and event handling.

### Course Contents:

#### Module I: Introduction to Java

Introduction, Java Virtual Machine and their architecture, JDK & JRE, Environment Variable, Features and differences with C++, Data Types, Identifiers and Variables, Operators and Expressions, Type Conversion, Control flow, arrays, Constants, Methods. Java Class Libraries: java.lang, java.io, java.math, java.text and java.util package.

#### Module II: Java with Object Orientated Features

**Class & Objects:** Introducing Classes, A Closer look at Methods and Classes, constructor, static members. **Inheritance:** Types and use of super keyword, Final method and classes. **Interfaces and Packages:** Definition and their implementation, defining class path. **Exception Handling:** Errors and Exceptions, Exception Handling Mechanism, caught and uncaught exceptions, Exception class hierarchy, handling exceptions with try, catch, finally block, defining custom exception. **Multithreading:** Thread life cycle, creating and controlling threads.

#### Module III: I/O and Applets

Run time input/output operations, io classes and their methods implementation, Applets life cycle, Applets program and their execution, Displaying various geometric shapes using 2D Graphics.

#### Module IV: GUI components using AWT and Event Handling

**AWT:** Making Windows, Frames, Panels, and Forms. Working with command buttons, text fields, labels, list boxes, layout manager, menus etc. **Event Handling:** Event Handling, Delegation Model, Event Classes, Event Listener interfaces, Adapter Classes.

### Examination Scheme:

Components	CT	HA/V/Q	Attd	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

## ADVANCED DATABASE MANAGEMENT SYSTEM

Course Code	L	T	P	Credit
MCA 303	2	1	-	3

### Course Objective:

To familiarize students with the advance database management system fundamentals and make students enable to deal with advance SQL query, indexing, optimization, concurrency control etc. and ADBMS administration works.

### Course Contents:

#### Module -I: Basics of PL/SQL

PL/SQL basics, blocks, architecture, variables, constants, attributes, character set, PL/SQL, data types, control structure, conditional and sequential control statements.

#### Module -II: PL/SQL

PL/SQL precompiler, cursors, type of cursors, exceptions, Indexing, View, triggers, PL/SQL Stored procedures and packages

#### Module -III: Distributed Databases

Introduction, Advantages, Architecture, Homogeneous & Heterogeneous DDBMS, Distributed Data Storage (Fragmentation & Replication), Distributed Transactions, Commit protocol, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing

#### Module-IV: Parallel Databases

Introduction, Architecture, I/O Parallelism and Skew, Inter-query Parallelism, Intra-query Parallelism, Intra-operation Parallelism (Parallel Sort, Parallel Join), Interoperation Parallelism, Design of Parallel Systems.

#### Module-V: Object Oriented Database Management System

Introduction, Object-Oriented Data Model, Object Oriented Languages, Persistent Programming Languages, Object-Relational Databases: Nested Relations, Complex Types, Inheritance, Reference Types, Querying with Complex Types, Functions and Procedures Storage for Object Databases.

### Examination Scheme:

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

### TEXT BOOKS:

2. H. F. Korth and A. Silberschatz: Database System Concepts, McGraw Hill, New Delhi, 1997.
3. Raghu Ramkrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill International, 2007
4. Abraham Silberschatz, Henry Korth, S, Sudarshan,, "Database System Concepts", McGraw Hill International, 2005
5. C.J.Date, Longman, "An Introduction to Database System", Pearson Education, 2003

### REFERENCE BOOKS:

1. R. A. Elmasri and S. B. Navathe: Fundamentals of Database Systems, 3rd ed., Addison-Wesley, 1998.
2. R. Ramakrishnan: Database Management Systems, 2nd ed., McGraw Hill, New York, 1999.
3. Elmasri R and Navathe SB, "Fundamentals of Database Systems", Addison Wesley, 2000.
4. Thomas Connolly, Carolyan Begg,, "Database Systems,: A Practical Approach to Design,
5. Implementation and Management, Addison Wesley, 2014 10
6. Ceri Pelagatti, "Distributed Database: Principles and System" , Addison Wesley, 1999.

## CORE JAVA LAB

Course Code	L	T	P	Credit
MCA322	-	-	2	1

- 1 Write a program to display your information using print () method.
- 4 Write a program to display “Java is an object oriented programming language” using command line arguments.
- 5 Write a program to perform all the arithmetic operation by taking inputs from command line.
- 6 Write a program to perform the addition of n nos. by taking inputs from command line.
- 7 Write a program to compute & print factorial of any given number.
- 8 Write a program to compute the sum of digits of a given integer.
- 9 Write a program to calculate & print first n Fibonacci numbers.
- 10 Write a program to reverse the digits of a numbers.
- 11 Write a program to show the use of typecasting.
- 12 Write a program to show the use of type conversion.
- 13 Write a program to show the use of Boolean data type.
- 14 Write a program to show the scope and lifetime of a variable.
- 15 Write a program to sort element of an array.
- 16 Write a program to perform the matrix addition & multiplication by allocation memory for an array dynamically.
- 17 Write a 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
- 18 Write a program to check whether a year is a leap year or not.
- 19 Write a program to read string from console and display the number of occurrence of each word.
- 20 Assume that a bank maintains account for its customers; it may be saving or 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. Perform the problem by using the switch cases. Include the necessary methods in order to achieve the following tasks inside switch case:
  - 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.  
 Display all the information.
- 21 Write a program to calculate the area of two different rectangle using class & objects.
- 22 Perform the Q. No. 21 by introducing methods for initializing the values and for calculating the area.
- 23 Perform the Q. No. 21 by introducing constructor for initializing the values.
- 24 Write a program to perform the Stack operations using class & objects.
- 25 Write a program to calculate the Volume of rectangle and cube using method overloading.
- 26 Perform the Q. No. 25 using constructor overloading.
- 27 Write a program to show pass by value and pass by reference.
- 28 Write a program to show how object and be returned.
- 29 Perform the Q. No. 7 using class, object and recursion.
- 30 Write a program to show how static can be used in java.
- 31 Input two one dimensional arrays A and B which are in ascending order. Write a program to merge them into a single sorted array C that contains every item from array A and B in ascending order.
- 32 Write a program to accept the shopping list of 5 items and stores them in a vector to accomplish the following task.
1. Delete an item from the list.
  2. Add an item at a specified location in the list.
  3. Add item at the end of the list.
- Print all the desired information. Perform the task using class & objects.
- 33 Assume that the bank maintains two kinds of account. One called Saving Account and the other is Current Account. The saving account provides compound interest and withdrawal facility but no cheque book facility. The current account provides cheque book facility and withdrawal facility but no interest. Current account holders should also maintains a minimum balance and if the balance falls below this level, a service charge is imposed.  
 Create a class Account that stores customer name, account number, and the type of account. From this derive the class curr\_acct and sav\_acct to make them more specific to their requirement. Include the necessary methods in order to achieve the following task.
- Accept deposit from customer and update the balance.
  - Display the balance.
  - Permit withdrawal and compute the balance.
  - Check for minimum balance, impose penalty if necessary and update the balance.
- Display all the desired information.
- 34 Write a program to show the use of super.

- 35 Assume that the publishing company markets print books and digital books. Create a class named Publication with data members named title, price and authors name. from Publication class derive two classes named Books and Ebooks. The class adds a page count data member named pcount while Ebook adds data member playing time name ptime. Each of the classes must have member functions getdata() to read class specific data from keyboard and displaydata() to output the class specific data to the computer screen. Write a Program to test these classes.
- 36 Assume that a shape interface contains the data members PI and functions area () and perimeter (). Implement these two methods according to type of shape like circle, rectangle and square classes.
- 37 Assume that binary interface contains the method: binary to decimal, decimal to binary, two's complement and binary addition. Create the appropriate classes to implement these methods.
- 38 Write a program to display the use of all access modifiers with the help of two packages
- 39 Design a package to contain the class student and another package that contains the interface sports. Write a program to display the Rollno, Paper1, Paper2 and total score of the candidates.
- 40 Write a program to show the use of simple try/catch statement.
- 41 Write a program to show the use of nested try/catch statements.
- 42 Write a program to show the use of “throw”, “throws” and “finally” keyword.
- 43 Write a program to create a custom exception. Show its use with the help o java program.
- 44 Write a program to read two integer number and calculate the division of these two numbers, throw an exception when wrong type of data is keyed in. and also maintain a try block to detect and throw exception if condition “divide by zero” occurs.
- 45 Define an exception called “NoMatchException” that is thrown when a string is not equal to “India”. Write a program that uses this exception.
- 46 Write a program to copy characters from one file into another using character streams
- 47 Write a program to write bytes to a file.
- 48 Write a program to read bytes from file by using program no 47.
- 49 Write a program to create a sequential file that could store details of five students. Details include id, name, class, semester, three subject marks. Compute and print students information and their total marks.
- 50 Write a program to show reading and writing with random access file. At the same time append some text to a file.
- 51 Write an applet program to print Hello.
- 52 Write an applet program to print Hello by passing parameter.
- 53 Write a program to perform the arithmetic operations by using interactive inputs to an applet.

54 Write a program to draw various shapes (at least 5) using methods of graphics class.

55 Write an applet program to draw bar charts.

Year	2009	2010	2011	2012	2013	2014
Turnover (Rs. Crores)	110	150	135	200	210	185

56 Write an applet program to insert image, audio and video data.

57 Write a program to illustrate the use of multithreading. Also set priorities for threads.

58 Write a program that connects to a server by using a socket and sends a greeting, and then waits for a response.

59 Write a program to create server application that uses the Socket class to listen for clients on a port number specified by a command-line argument:

60 Write a program to show the use of methods of the ArrayList and LinkedList classes.

61 Write a program to show how Vector class can be used.

62 Write a program to search an element in a collection using binarySearch method.

63 Write a program to create a file using text fields in windows.

a. TextFiled: Roll\_number, Name and marks.

b. Button: enter and done.

c. Labels: Roll Number, Student Name and Marks.

64 Write a program to read the file using text fields from program no 63.

65 Write a program depicting the usages of keyboard event in an applet.

66 Write a program to expand ring on mouse click.

67 Write a program to create a simple notepad in windows. Add more modules to the notepad as per your intelligence.

#### 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 DATABASE MANAGEMENT SYSTEM LAB

Course Code	L	T	P	Credit
MCA323	-	-	2	1

### INSTRUCTIONS TO STUDENTS

1. Students should be regular and come prepared for the lab practice.
2. In case a student misses a class, it is his/her responsibility to complete that missed experiment(s).
3. Students should bring the observation book, lab journal and lab manual. Prescribed textbook and class notes can be kept ready for reference if required.
4. They should implement the given experiment individually.
5. While conducting the experiments students should see that their programs would meet the following criteria:
  - Programs should be interactive with appropriate prompt messages, error messages if any, and descriptive messages for outputs.
  - Programs should perform input validation (Data type, range error, etc.) and give appropriate error messages and suggest corrective actions.
  - Comments should be used to give the statement of the problem and every function should indicate the purpose of the function, inputs and outputs
  - Statements within the program should be properly indented
  - Use meaningful names for variables and functions.
  - Make use of Constants and type definitions wherever needed.
6. Once the experiment(s) get executed, they should show the program and results to the instructors and copy the same in their observation book.
7. Questions for lab tests and exam need not necessarily be limited to the questions in the manual, but could involve some variations and / or combinations of the questions.

### LAB CONTENTS

SL NO.	TITLE OF EXPERIMENT	WEEKS
1.	SQL BASICS	2
	weeks	
2.	Analyzing given system and preparing ERmodel and converting it to relational schema.	
	1 week	
3.	SQL Advanced Commands	2
	weeks	
4.	PL/SQL BASICS & Cursor	1
	week	
5.	Cursors continued & exception handling	
	1 week	
6.	Triggers	1
	week	

7. Procedures, Functions, Packages  
2 weeks
8. Interfacing DB with any latest front end  
1 week
9. Implementation  
week

1

### LIST OF PROGRAMS

#### 1. Week 1 SQL

1.1 Create table EMP with following columns and constraints>Note:

**Note: Give descriptive enough name to the constraints**

Name	Type	Constraint
EMPNO	NUMBER(4)	Make this as primary key after creating table
ENAME	VARCHAR2(10)	
JOB	VARCHAR2(9)	CLRK/MGR/A.MGR/GM/CEO, default CLRK
MGR_ID	NUMBER(4)	References EMP
DATE_BIRTH	DATE	Must be less than joining Date
SAL	NUMBER(7,2)	More than 20000,default 20001
COMM	NUMBER(7,2)	DEFAULT 1000
DEPTNO	VARCHAR2(3)	References DEPT
DATE_OF_JOIN	DATE	

Add a primary key constraint to EMP table after creating the table

1.2 Create table DEPT with following columns and constraints

Name	Type	Constraint
DNO	VARCHAR2(3)	Primary Key and Starts from 'D'
DNAME	VARCHAR2(10)	Unique
LOCATION	VARCHAR2(9)	BNG/MNG/MUB/HYD/CHN, default BNG

1.3 Create table PROJECTs with following constraints

Combination of DNO and PRJ\_NO is primary key

Name	Type	Constraint
DNO	VARCHAR2(3)	References DEPT ,NOT NULL
PRJ_NO	VARCHAR2(5)	Starts from 'P' , NOT NULL
PRJ_NAME	VARCHAR2(10)	
PRJ_CREDITS	NUMBER(2)	Range from 1 to 10
STRT_DATE	DATE	
END_DATE	DATE	END_DATE > START_DATE

Add a column to EMP table named PRJ\_ID. Add a foreign key constraint to EMP table on (DeptNo,Proj\_Id) referencing PROJECTS. Indicates -an employee from which department is working on which project/s.

#### 1.4 Insert records into EMP table

In the following records take any valid values to the columns left blank, columns with null must be entered with null values only

Empno	Ename	Job	MgR_ID	Date_ofBirth	Sal	comm	Deptno	Prj_Id	Dateof join
100	Ravi	MGR	111	10-10-1985	32000		D1	P1	2-10-2001
102	Raviraj	CLRK	100	10-12-1980	24000		D1	P3	12-11-2000
111	Raghu	GM	150	10-12-1974	45000	15000	null	null	3-12-1985
150		CEO	null	10-12-1970	60000	30000	null	null	3-12-1990
103		A.CLRK	111	10-12-1980			D1	P1	2-10-2001
103		CLRK	111	2-10-1980			D1	P3	2-10-2002
125	Manu	A.MGR	150	10-12-1980			D4	P2	2-10-2002
104		CLERK	100	2-10-1980			D2	P1	2-10-2005
106		MGR	100	2-10-1986			D2		2-10-1985
123	Mahesh	CLRK	106	10-12-1974	25000		D3	P2	2-10-2002
108		CLRK	106	10-12-1970			D9		2-10-1985
103		CLRK	111	10-12-1980			D1	P3	2-10-2001
null		CLRK	106	10-12-1980	18000				10-12-1980

#### 1.5 Insert records into DEPT table

<b>DNO</b>	<b>DName</b>	<b>Location</b>
D1	Marketing	CHN
D2	Research	MNG
D3	Administrator	BNG
D4		BGG
D5	IT	BNG
Null	Corporate	HYD

Write the reason if some records are not inserted. Insert your own 2 records

### 1.6 Insert records into PROJECTS

<b>Dno</b>	<b>Prj_No</b>	<b>Prj_Name</b>	<b>Prj_Credits</b>
D1	P1		2
D2	P1		2
D3	P2		7
D1	P3		5
D4	P2		7

Insert your own 2 records

#### 2. Week 2

2.1 Display all records from EMP,DEPT and PROJECTS table

2.2 Display records of Employees who have salary more than 25000 or working in department D2

2.3 Delete employee records working on project P2 and confirm the result. Type ROLLBACK to restore records back if records are deleted.

2.4 Delete department Marketing from DEPT table, confirm the result with reason. Type ROLLBACK to restore records back if records are deleted.

2.5 Delete records of employees working under Manger with ID 100 and in project P1.

2.6 Update the DNO of first record in PROJECTS to D5, confirm the result with reason.

2.7 Update the Job of employee with EmpNo 123 to MGR, salary to 35000 and his manager as 111.

2.8 List all employee names and their salaries, whose salary lies between 25200/- and 35200/- both inclusive.

2.9 List all employee names reporting to employees 100,125,150

2.10 List all employees whose name starts with either M or R.

2.11 List the name of employees whose name do not starts with M.

2.12 List all kind jobs available in employee table, avoid displaying duplicates.

2.13 List minimum, maximum, average salaries in company.

2.14 Display the number of employees working in each project.

2.15 List the Employees name and their manager's names

2.16 List Employees Name, their department name and Projects Name in which they are working.

2.17 List the employee names, salary of employees whose first character of name is R, 2nd and 3rd characters are 'v','i' and remaining characters are unknown.

#### 3. Week 3

3.1 List the Projects name undertaken by Marketing Department.

3.2 Display current date, 53, absolute value of -45 and current date as date with format MONTH-YY.

3.3 Display the employees name and salary in descending order by salary.

3.4 List the name of departments which are working with more than 1 project

3.5 Display department name, Max salary and Min salary in each department.

3.6 List the employees whose experience is more than 5 years.

- 3.7 List the Employees number, Name and their Age and retirement date(assume 60 years retirement age).
- 3.8 List the Employees who born on December month.
- 3.9 List the Employees names who born on a given year.
- 3.10 List the Employees names who joined on day 12.
- 3.11 List the Employees names having service experience more than 10 years.
- 3.12 List the projects which have duration more than 1 year.
- 3.13 List the Employees Name who is working at Locations (BNG,MUB,HYD)7
- 3.14 Update the COMM column of EMP table based on the SAL. Use  $COMM=CMM+SAL*10/100$
- 3.15 List employee names, padded to right with a series of three periods and space up to a width of 30, and project credits of projects in which they are working.(Use RPAD,LPAD)
- 3.16 List the name of employees who are working in project with credit more than 7 and display name with only first letter capital and replace the character 'a'(if present) in the name by '\$'.
- 3.17 Display department Name and Total amount spent on each department by the company as Salary.
- 3.18 List Employee numbers, SAL \*12 (rename as ANNUAL\_SAL), SAL\*12 \*0.1 (as TAX) , display ANNUAL\_SAL and TAX in the format of \$12,34,456.90.
4. Week 4  
Analyzing the given system and designing ER –Model and converting the ER-model to relational scheme and implementing in Oracle. Listing the functionalities to be implemented and designing application logic(pseudo code) for the functionalities.
5. Week 5
  - 5.1 List Job category and total salary paid for the each jobs category by the company
  - 5.2 Display name of the department from which maximum number of employees are working on project P1
  - 5.3 Display department names and number of CLRK working in the departments.
  - 5.4 Display Employee names who are not working in any of the projects.
  - 5.5 Create a View EMP\_PRJ\_VW to display records of employees of 'marketing' department and project in which they are working.
  - 5.6 Display employee names and projects in which they are working using ViewEMP\_PRJ\_VW
  - 5.7 Insert a record into View EMP\_PRJ\_VW and check the underlying tables for result and confirm result with reason.
  - 5.8 Create an unique index on the column name DNAME on DEPT table
  - 5.9 Create an index on the columns (name and job) on EMP table.
  - 5.10 Create a Sequence STUD\_SEQ which starts from 100 to 999 with increments of 3.
  - 5.11 Create a table STUD with columns ROLLNO and Name. Insert ROLLNO values by taking values from STUD\_SEQ.
  - 5.12 Display Location of department and Employees name working in Marketing department or Research (using set operator).
  - 5.13 Display the names of the Departments undertaking both projects P1 and P3 (using set operator). 8
6. Week 6 - PL/SQL
  - 6.1 Write a PL/SQL block to insert row into EMP table.
  - 6.2 Write a PL/SQL block for performing money withdrawal operation. Assume that the account has to maintain minimum 2000/- always. Assume current balance is 5000/- display the message- 'WITHDRAWAL COMPLETED' if new balance after withdrawal is  $\geq 2000$  otherwise 'WITHDRAWAL NOT COMPLETED'
  - 6.3 Write a PL/SQL block to check an input string is palindrome or not palindrome.
  - 6.4 Write a PL/SQL block to reverse a given number.
  - 6.5 Write a PL/SQL block to accept employee number and display Employee Name, salary of employees in the format – 'RAVI draws 32000/- as salary'

- 6.6 \*Write a PL/SQL block to input employee number and display employee name, department name and project name on which employee is working for the given employee number.
- 6.7 Write a PL/SQL block to display ENAME and SAL of all employees drawing salary more than 30000/-.
- 6.8 Do the exercise 6.7 using cursor for loop.
7. Week 7
- 7.1 Write PL/SQL block to give salary hike of 10% to first five highest paid employees, create a save point for salary hike given to each of five employees Calculate total amount paid by the company as salary to all employees and it should not exceed 500000/-(this amount can be assumed suitably). If it exceeds, rollback up to the recent previous save point and check again to know whether total salary lies below 500000/- and so on. Commit the changes if total salary lies below 500000/-.
- 7.2 \*Write a PL/SQL block to process Pay roll of all Employees by calculating Bonus( considering Project Credits of projects in which they are working),HRA,PF,TAX,GROSS and NET\_SAL. Insert these salary details into a new table PAYROLL(EmpNo, Pay\_Date, Salary, Bonus, HRA, GROSS,PF, TAX, NET\_SAL). Note Salary is same as Sal from EMP table, Bonus=Salary\*Proj\_Credits/100, HRA=10% of Salary, PF=10% of Salary GROSS=Salary +Bonus + HRA, TAX=10% of GROSS, NET\_SAL=GROSS-PFTAX.(Hint: use two cursor one for EMP and another for different projects and their credits)
- 7.3 Write a PL/SQL block (using parameterized cursor) to display first two employees details (Name, Salary, Department Name) in ascending order by their salary and working in Project P1. 7.4 Write a PL/SQL block to accept, Principle, Interest rate and duration (in years) to calculate Interest to be paid. Handle the exceptions if Principle <=1000, interest rate <5 , year <1 and display proper error message for each.9
- 7.5 Write a PL/SQL block to accept employee number from user and display employee details such as Empno, Name, and Sal. Handle the exception raised –  
 (i) If user entered a non-existing employee number.  
 (ii) If the salary more than 25000/-  
 If employee exists and salary is less than 25000/- then update that salary to 25000/-
- 7.6 When the oracle looks for the exception OTHERS and give an example for a PL/SQL block where OTHERS is used and explain it.
- 7.7 \* Write a PL/SQL block to insert record into EMP table with exception handling for oracle error numbers ORA-01438,ORA-01722,ORA-00904 and display proper error messages.  
 ORA-01438 –if salary value entered more than given digits width.ORA-01722 – if a character value is inserted into Salary (or to any numeric value column) ORA-00904 – if column name entered is incorrect.
8. Week 8
- 8.1 Write a PL/SQL trigger to fire when there is an updation of salary of any Empno and record the Empno, Dept. Name and Old Salary, date on which salary is modified and user name who modified information in the table SAL\_MOD (Empno, Dname, Old\_Sal, Mod\_Date, Modifier)
- 8.2 Write a PL/SQL trigger to fire when there is an insert /update/deletes operation on EMP table; record the information in AUDIT\_EMP table which has same structure as that of EMP along with a new column OPERATION (storesUPDATE/INSERT/DELETE depending on operation being done.)
- 8.3 Write a PL/SQL block trigger to do INSERT/UPDATE/DELETE operation onlyduring week days. Raise an exception if the day is SAT or SUN and also display user name who initiated operation.
- 8.4 Write a PL/SQL block trigger to check existence of child records in EMP table on Performing DELETE operation on DEPT table. If child records exists display message and cancel the delete operation otherwise perform delete operation.

- 8.5 Do the program 4.16 using INSTEAD OF option.
- 8.6 \*Write PL/SQL block trigger to insert a record into a view EMP\_DEPT\_VIEW. Create the view containing EMPNO, ENAME, DATE\_OF\_BIRTH DEPTNO, and DNAME. Use INSTEAD OF option with trigger to make records to insert into underlying tables.
9. Week 9
- 9.1 Write a procedure to calculate simple interest, taking principle, rate and year as inputs.
- 9.2 Write a procedure to take SAL of given Employee as input and calculate HRA, PF,DA, GROSS, TAX and NETSAL and return them to calling PL/SQL block(take EMPNO as keyboard input to get SAL)
- 9.3 Write a function to calculate square of a number and return calculated value to calling PL/SQL block.
- 9.4 Write two functions to calculate age and service experience of all employees and return these values to calling PL/SQL block and display.
- 9.5 Write functions to find department name and number of projects it is handling.Display this information in the calling PL/SQL block.
- 9.6 Write a package containing procedure to calculate area of circle, perimeter and a function to find factorial of a number.
- 9.7 Write a package containing a procedure to display Employee name, department name, immediate superior name and a function to display retirement date by considering date of birth and retiring age as 65 years.
10. Week 10  
Interfacing Oracle database with any latest front end and prepare GUI layout prototypes for the system under consideration.
11. Week 11  
Implementing GUI layouts and application logic for the system under consideration.
12. Week 12  
Completing the implementation of application for system under considerations and validation, basic functionality testing.

**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.

## MOBILE COMPUTING

Course Code	L	T	P	Credit
MCA331	2	1	-	3

### Course Objective:

The objective of this subject is to make students familiar about the basic concepts mobile technology, computing and market

### Course Contents:

#### Module I:

**Global System for Mobile Communication (GSM) system overview:** GSM Architecture, Mobility management, Network signalling. GSM Additional services: Teletext, Facsimile, Videotext services.

#### Module II: (Wireless) Medium Access Control

Motivation for a specialized

MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

**Mobile Network Layer:** Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

**Module III: Mobile Transport Layer:** Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

#### Module IV: Mobile Data Communication

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

**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 V: Global Mobile Satellite Systems

Mobile Satellite Systems (GEO, MEO and LEO), case studies of the IRIDIUM and GLOBALSTAR systems.

### Examination Scheme:

Components	Quiz	Presentation	Assignment	Attd	EE
Weightage (%)	5	10	10	5	70

### Text & References:

#### Text:

- “Mobile Communications”, 2nd Edition, Jochen Schiller, 2003

#### References:

- “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.
- “Third Generation Mobile Telecommunication systems”, by P. Stavronlakis, Springer Publishers, 2001.

## THEORY OF COMPUTATION

Course Code	L	T	P	Credit
MCA 332	2	1	-	3

### UNIT-I

**Theory of Automata:** Definition of an Automaton, Description of a Finite Automaton, Transition Systems, Properties of Transition Functions, Acceptability of a String by a Finite Automaton, Nondeterministic Finite State Machines, The Equivalence of DFA and NFA, Mealy and Moore Models, Minimization of Finite Automata Exercises

### UNIT-II

**Formal Language:** Basic Definitions and Examples, Chomsky Classification of Languages, Languages and Their Relation, Recursive and Recursively Enumerable Sets, Operations on Languages, Languages and Automata

### UNIT-III

**Regular Sets and Regular Grammars:** Regular Expressions, Finite Automata and Regular Expressions, Pumping Lemma for Regular Sets, Application of Pumping lemma, Closure Properties of Regular Sets, Regular Sets and Regular Grammars

### UNIT-IV

**Context-Free languages and Pushdown Automata:** Context-free languages and Derivation Trees, Ambiguity in Context free Grammars, Simplification of Context-free Grammars, Normal Forms, Pumping Lemma and Decision Algorithms for context free languages, Basic Definitions of Pushdown Automata, Acceptance by pda, Pushdown Automata and Context free Languages, Parsing and Pushdown Automata

### UNIT-IV

**Turing Machines and Linear Bounded Automata:** Turing Machine Model, Representation of Turing Machines, Language Acceptability by Turing Machines, Design of Turing Machines, Universal Turing Machines and Other modifications, The Model of Linear Bounded Automaton, Turing Machines and Type 0 Grammars, Linear Bounded Automata and languages, Halting Problem of Turing Machines, NP-Completeness.

### Examination Scheme:

Components	Quiz	Presentation	Assignment	Attd	EE
Weightage (%)	5	10	10	5	70

### Text Books:

- Mishra K.L.P. and N. Chandrasekaran : Theory of Computer Science (Automata, Languages and Computation), Prentice Hall of India, New Delhi, 2005.
- John C Martin, "Introduction to Languages and the Theory of Computation", Third Edition, Tata McGraw Hill Publishing Company, New Delhi, 2007. (UNIT 4, 5)
- Hopcroft J.E. Motwani R. and Ullman J.D. "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2008. (UNIT 1, 2, 3)

### References Books:

- Mishra K L P and Chandrasekaran N, "Theory of computer Science-Automata, Languages and Computation", Third Edition, Prentice Hall of India, 2004.
- Harry R Lewis and Christos H Papadimitriou, "Elements of the Theory of Computation", Second Edition, Prentice Hall of India, Pearson Education, New Delhi, 2003.
- Peter Linz, "An introduction to Formal Language and Automata", Third Edition, Narosa Publications, New Delhi, 2002.
- Kamla Krithivasan and Rama. R, "introduction to Formal languages, Automata Theory and Computation", Pearson Education 2009.

## ANALYSIS AND DESIGN OF ALGORITHMS

Course Code	L	T	P	Credit
MCA 333	2	1	-	3

### Course Objective:

The primary objective of this course is to provide the fundamentals concepts of Design & analysis of Algorithms. To provides knowledge of Time and space complexity of algorithms. This course is to including Mathematical foundations, Sorting & searching Order Statistics, Data Structures, Advanced Design & Analysis techniques such as Divide & Conquer, greedy method, graph theory & Dynamic Programming approaches.

### Course Contents:

#### Module I: Algorithm Analysis

Introduction Algorithms Complexity measures, Best, worst and average-case complexity functions, problem complexity, quick review of basic data structures and algorithm design principles.

#### Module II: Sorting and searching Order statistics

Sorting by selection, insertion and bubble, Divide & Conquer Strategy, Heap Sort, Quick Sort Data Sorting in Linear time. other sorting algorithms— radix sort, merge sort, sternsons Matrix Multiplication.

Searching in static table— binary search, path lengths in binary trees and applications, optimality of binary search in worst cast and average-case Binary search trees, construction of optimal weighted binary search trees; Searching in dynamic table -randomly grown binary search trees, AVL and (a, b) trees. Hashing: Basic ingredients, analysis of hashing with chaining and with open addressing.

#### Module III: Advanced Design and Analysis Techniques

Dynamic programming- Elements of dynamic programming, Chain-matrix multiplication, All pair shortest path (Flayed -algorithm), Optimal Binary Search Tree.

Greedy algorithms- Elements of the greedy strategy, Huffman codes, Single-source shortest path in a directed graph, Knapsack problem.

#### Module IV: Graph Algorithms

Elementary graphs Algorithms, Minimum spanning Trees minimum spanning trees— Kruskal's and Prim's algorithms— Johnson's implementation of Prim's algorithm using priority queue data structures, Single source Shortest paths, All Pair Shortest Paths. *String processing* : String searching and Pattern matching, Knuth-Morris-Pratt algorithm and its analysis.

#### Module V : NP-completeness

Informal concepts of deterministic and nondeterministic algorithms, P and NP , NP-completeness, statement of Cook's theorem, some standard NP-complete problems, approximation algorithms.

**Examination Scheme:**

<b>Components</b>	<b>Quiz</b>	<b>Presentation</b>	<b>Assignment</b>	<b>Attd</b>	<b>EE</b>
<b>Weightage (%)</b>	5	10	10	5	70

**Text Books:**

- T. H. Cormen, C. E. Leiserson and R. L. Rivest: Introduction to Algorithms, Prentice Hall of India, New Delhi, 1998.
- E. Horowitz and S. Sahani: Fundamental of Computer Algorithms, Galgotia Pub. /Pitman, New Delhi/London, 1987/1978.

**References Books:**

- A. Aho, J. Hopcroft and J. Ullman; The Design and Analysis of Computer Algorithms, A. W. L, International Student Edition, Singapore, 1998
- S. Baase: Computer Algorithms: Introduction to Design and Analysis, 2nd ed., Addison- Wesley, California, 1988.
- K. Mehlhom: Data Structures and Algorithms, Vol. 1 and Vol. 2, Springer-Verlag, Berlin, 1984.
- A. Borodin and I. Munro: The Computational Complexity of Algebraic and Numeric Problems, American Elsevier, New York, 1975.
- D. E. Knuth: The Art of Computer Programming, Vol. 1, Vol. 2 and Vol. 3. Vol. 1, 2nd ed., Narosa/Addison-Wesley, New Delhi/London, 1973; Vol. 2: 2nd ed., Addison-Wesley, 18 London, 1981; Vol. 3: Addison-Wesley, London, 1973.
- S. Winograd: The Arithmetic Complexity of Computation, SIAM, New York, 1980.

# COMPUTER GRAPHICS

Course Code	L	T	P	Credit
MCA 334	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.

### Module IV

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

## Examination Scheme:

Components	Quiz	Presentation	Assignment	Attd	EE
Weightage (%)	5	10	10	5	70

## Text Books:

1. Computer Graphics, Donald Hearn, M Pauline Baker, 2<sup>nd</sup> Edition, PHI 1999
2. Schaum Series, Computer Graphics

## References Books:

1. Computer Graphics, N. Krishnamurthy, TMH

# DATA WAREHOUSING AND DATA MINING

Course Code	L	T	P	Credit
MCA 335	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:**

<b>Components</b>	<b>CT</b>	<b>HA/V/Q</b>	<b>Attd</b>	<b>EE</b>
<b>Weightage (%)</b>	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 Kanf man 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.

## OPEN SOURCE TECHNOLOGIES

Course Code	L	T	P	Credit
MCA 336	2	1	-	3

### Course Objective:

The primary objective of this course is to understand all the components of XML. An understanding of some advanced open source issues, including elements, attributes, namespace, reference etc The ability to write xml code.

### Course Contents:

#### Module – I Introduction to XML

The Difference Between XML and HTML, Predefined Tags, Extensible, Transaction Data, XML Tree, Tree Structure, XML Document, Syntax Rules, XML Prolog, Case Sensitive, Attribute and Values, Comments, Well Formed XML, XML Elements, Empty XML, XML Naming Rules, Extensible, XML Attributes, Elements vs. Attributes, Displaying XML, Viewing XML Files,

#### Module – II XHTML and DTD

XHTML –eXtensible HyperText Markup Language, Basic syntactic rules, General format, XHTML validation, XML DTD, Building Blocks of XML Documents, Elements, Attributes, Entities, PCDATA, CDATA, #REQUIRED, #IMPLIED, #FIXED, Elements vs. Attributes, Entities, Internal Entity Declaration, External Entity Declaration, Internal DTD Declaration, External DTD Declaration

#### Module – III XML Schemas & Parser

Introduction to XML Schemas, need XML Schemas, Structure of a Schema, XML Schema Components, XSD document, Reference, Simple, XML Abstract Data Model, XML document & XML Schema, Simple Type Definition VS. Complex Type Definition, Simple Types, Complex Types, Parser, DOM, SAX

#### Module – IV XSL, XSL & XSLT

XSLT Introduction, Transformations, Create an XSL Style Sheet, Link the XSL Style Sheet to the XML Document, XSLT Element, xsl:for-each, xsl:value-of, xsl:template, xsl:sort, xsl:if, xsl:choose, XPath, XML Schema, Element, Default and Fixed Values Data Types, Syntax, Attributes, Restrictions/Facets, XML Parser, XML DOM,HTML DOM, XML and XPath, XSLT, Displaying XML with XSLT, XSLT Stylesheet,

### Examination Scheme:

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

### Text & References:

#### Text:

- Beginning XML Paperback – Joe Fawcett, Danny Ayers),Liam R. E. Quin

#### References:

- Beginning XML, 5th Edition, Danny Ayers, Joe Fawcett, Liam Quin
- Rockley, A., & Cooper, C. (2012). Managing enterprise content: A unified content strategy (2nd ed.). Berkeley, CA: New Riders.
- Rosenfeld, L., Morville, P. & Arango, J. (2015). Information architecture: for the Web and beyond. (4. ed.) Sebastopol: O'Reilly.

## NETWORK FUNDAMENTAL

Course Code	L	T	P	Credit
MCA337	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:**

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

#### **Text & References:**

##### ***Text:***

- Cisco Networking Academy Programme CCNA 1 & 2 Companion Guide, 3<sup>rd</sup> Edn by Pearson Education
- Cisco Networking Academy Programme CCNA 1 & 2 Lab Companion, 3<sup>rd</sup> Edn by Pearson Education
- Cisco Networking Academy Programme CCNA 1 & 2 Engineering General, 3<sup>rd</sup> 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.

## COMPUTER GRAPHICS LAB

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>MCA 344</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>1</b>

### INSTRUCTIONS TO STUDENTS

1. Students should be regular and come prepared for the lab practice.
2. In case a student misses a class, it is his/her responsibility to complete that missed experiment(s).
3. Students should bring the observation book, lab journal and lab manual. Prescribed textbook and class notes can be kept ready for reference if required.
4. They should implement the given experiment individually.
5. While conducting the experiments students should see that their programs would meet the following criteria:
  - Programs should be interactive with appropriate prompt messages, error messages if any, and descriptive messages for outputs.
  - Programs should perform input validation (Data type, range error, etc.) and give appropriate error messages and suggest corrective actions.
  - Comments should be used to give the statement of the problem and every function should indicate the purpose of the function, inputs and outputs
  - Statements within the program should be properly indented
  - Use meaningful names for variables and functions.
  - Make use of Constants and type definitions wherever needed.
6. Once the experiment(s) get executed, they should show the program and results to the instructors and copy the same in their observation book.
7. Questions for lab tests and exam need not necessarily be limited to the questions in the manual, but could involve some variations and / or combinations of the questions.

### LAB CONTENTS

SL NO.	TITLE OF EXPERIMENT	WEEKS
1	Basic Shapes and Colors	1
	week	
2	Pattern creation using setfillstyle	1
	week	
3	Random Pattern Generation	1 week
4	Line Pattern Generation	1 week
5	Human Face Generation	1
	week	
6	2D Transformation – Rectangle	1 week
7	2D Transformation – Triangle	1 week
8	2D Transformation – Shearing & Reflection	1 week
9	3D Transformation – Cuboid	1 week
10	3D Transformation – Rotation about axis	1
	week	
11	2D Composite Transformation	1 week
12	3D Composite Transformation	1 week

**Ex. No. 1**

Basic Shapes and Colors

**Aim:**

To implement shape and color functions in the graphics.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using `initgraph()`

**Step 3:** Draw different shapes using graphics inbuilt functions such as `circle()`, `Ellipse()`, `rectangle()`, `outtextxy ()`, `line()`, `drawpoly()`.

**Step 4:** Stop the process.

**Ex. No. 2**

**Pattern creation using `setfillstyle`**

**Aim:**

To create patterns using `setfillstyle()` in the graphics.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using `initgraph()`

**Step 3:** Draw different patterns using the graphics inbuilt function `setfillstyle()`.

**Step 4:** Stop the process.

**Ex. No. 3**

**Random Pattern Generation**

**Aim:**

To create random patterns in the graphics using `random()` function.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using `initgraph()`

**Step 3:** Draw random patterns using the graphics inbuilt functions such as `circle()`, `bar()` and `setfillstyle()`.

**Step 4:** Stop the process.

**Ex. No. 4**

**Line Pattern Generation**

**Aim:**

To generate line patterns in the graphics.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using `initgraph()`

**Step 3:** Draw line patterns using the graphics inbuilt functions `setlinestyle ()`.

**Step 4:** Stop the process.

**Ex. No. 5**

**Human Face Generation**

**Aim:**

To generate a human face in the graphics.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using `initgraph()`

**Step 3:** Draw human face using the graphics inbuilt functions.

**Step 4:** Stop the process.

**Source Code:**

```

#include<stdio.h>
#include<conio.h>
#include<graphics.h>
void main()
{
int gd=DETECT,gm;
initgraph(&gd,&gm,"c:\tc\bgi");
setcolor(GREEN);
setbkcolor(0);
/*-----CHIN-----*/

ellipse(298,244,160,380,60,80);

/*----- HAIR -----*/

arc(300,219,400,140,80);
ellipse(355,190,270,438,10,28);
arc(359,188,169,265,30);
ellipse(288,190,180,360,40,20);
ellipse(239,193,96,370,8,25);

/*-----Eye Brows-----*/

arc(282,255,89,130,40);
arc(278,259,80,120,40);
arc(314,255,405,92,40);
arc(319,259,420,100,40);
line(310,215,310,220);
line(284,215,284,219);

/*-----Eyes-----*/

setfillstyle(SOLID_FILL,WHITE);
ellipse(320,230,0,360,10,5);
ellipse(275,230,0,360,10,5);
fillellipse(320,230,10,5);
fillellipse(275,230,10,5);
setfillstyle(SOLID_FILL,BLACK);
ellipse(320,230,0,360,4,4);
ellipse(275,230,0,360,4,4);
fillellipse(320,230,5,5);
fillellipse(275,230,5,5);

/*-----Nose-----*/

ellipse(280,220,270,0,10,40);
ellipse(315,220,180,270,10,40);
ellipse(285,260,100,285,8,7);
ellipse(310,260,255,70,8,7);
circle(320,230,2);
circle(275,230,2);
arc(297,257,228,689,15);
/*-----MOUTH-----*/

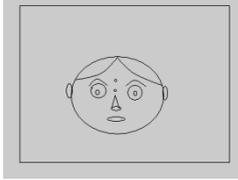
ellipse(298,290,0,360,30,7);
line(270,290,326,290);

```

```
/*-----Ears-----*/
```

```
ellipse(234,240,0,330,4,20);  
ellipse(362,240,220,170,4,20);  
getch();  
closegraph();  
restorecrtmode();  
}
```

**Output:**



### Ex. No. 6

#### 2D Transformation - Rectangle

##### Aim:

To create a rectangle and apply 2D transformations like Scaling, Rotation and Translation.

##### Algorithm:

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using initgraph()

**Step 3:** Initialize the variables

**Step 4:** Enter the choice for transformation

**Step 5:** If choice = 2 translation (i.e.) changing the coordinates of the object is performed

$$x' = x + tx$$

$$y' = y + ty$$

**Step 6 :** If choice = 3 rotation (i.e.) rotating the angle of the object is performed

$$x' = x*\cos\theta - y*\sin\theta$$

$$y' = x*\sin\theta + y*\cos\theta$$

**Step 7:** If choice = 4 scaling (i.e.) resizing the object is performed

$$x' = x * sx$$

$$y' = y * sy$$

**Step 8:** Stop the process.

### Ex. No. 7

#### 2D Transformation - Triangle

##### Aim:

To create a simple triangle and apply 2D transformations like Scaling, Rotation and Translation.

##### Algorithm:

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using initgraph()

**Step 3:** Declare a structure with necessary variables and functions

**Step 4:** Initialize the variables

**Step 5:** Enter the choice for transformation

**Step 6:** If choice = 1 scaling (i.e.) resizing the object is performed

$$x' = x * sx$$

$$y' = y * sy$$

**Step 7 :** If choice = 2 rotation (i.e.) rotating the angle of the object is performed

$$x' = x*\cos\theta - y*\sin\theta$$

$$y' = x*\sin\theta + y*\cos\theta$$

**Step 8:** If choice = 3 translation (i.e.) changing the coordinates of the object is performed

$$x' = x + tx$$

$$y' = y + ty$$

**Step 9:** Stop the process.

**Ex. No. 8**

### 2D Transformation – Shearing & Reflection

**Aim:**

To create a simple object and apply 2D transformations like Scaling, Rotation, Translation, Shearing and Reflection.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using initgraph()

**Step 3:** Initialize the variables

**Step 4:** Enter the choice for transformation

**Step 5:** If choice = 1 translation (i.e.) changing the coordinates of the object is performed

$$x' = x + tx$$

$$y' = y + ty$$

**Step 6 :** If choice = 2 scaling (i.e.) resizing the object is performed

$$x' = x * sx$$

$$y' = y * sy$$

**Step 7:** If choice = 3 rotation (i.e.) rotating the angle of the object is performed

$$x' = x*\cos\theta - y*\sin\theta$$

$$y' = x*\sin\theta + y*\cos\theta$$

**Step 8:** If choice = 4 shearing (i.e.) distortion of the object is performed

$$x' = x + sh*y1;$$

$$y' = y;$$

**Step 9:** If choice = 5 reflection (i.e.) mirror image of the object is generated

**Step 10:** Stop the process.

**Ex. No. 9**

### 3D Transformation - Cuboid

**Aim:**

To create a cuboid and apply 3D transformations like Scaling, Rotation and Translation.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using initgraph()

**Step 3:** Initialize the variables

**Step 4:** Enter the choice for transformation

**Step 5:** If choice = 2 translation (i.e.) changing the coordinates of the object is performed

$$x' = x + tx$$

$$y' = y + ty$$

$$z' = z + tz$$

**Step 6 :** If choice = 3 rotation (i.e.) rotating the angle of the object is performed

$$y' = y*\cos\theta - z*\sin\theta$$

$$z' = y*\sin\theta + z*\cos\theta$$

$$x' = x$$

**Step 7:** If choice = 4 scaling (i.e.) resizing the object is performed

$$x' = x * sx$$

$$y' = y * sy$$

$$z' = z * sz$$

**Step 8:** Stop the process.

### Ex. No. 10

#### 3D Transformation – Rotation about axis

**Aim:**

To create a cube and apply 3D transformations like Scaling, Rotation about axis and Translation.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using initgraph()

**Step 3:** Initialize the variables

**Step 4:** Enter the choice for transformation

**Step 5:** If choice = 2 translation (i.e.) changing the coordinates of the object is performed

$$x' = x + tx$$

$$y' = y + ty$$

$$z' = z + tz$$

**Step 6 :** If choice = 3 rotation (i.e.) rotating the angle of the object is performed

About X-axis

$$y' = y * \cos\theta - z * \sin\theta$$

$$z' = y * \sin\theta + z * \cos\theta$$

$$x' = x$$

About Y-axis

$$z' = z * \cos\theta - x * \sin\theta$$

$$x' = z * \sin\theta + x * \cos\theta$$

$$y' = y$$

About Z-axis

$$x' = x * \cos\theta - y * \sin\theta$$

$$y' = x * \sin\theta + y * \cos\theta$$

$$z' = z$$

**Step 7:** If choice = 4 scaling (i.e.) resizing the object is performed

$$x' = x * sx$$

$$y' = y * sy$$

$$z' = z * sz$$

**Step 8:** Stop the process.

### Ex. No. 11

#### 2D Composite Transformation

**Aim:**

To create a triangle and apply 2D composite transformations like Scaling, Rotation and Translation.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using initgraph()

**Step 3:** Initialize the variables

**Step 4:** Enter the choice for transformation

**Step 5:** If choice = 1 two successive translation & rotation are performed

**Step 6 :** If choice = 2 two successive translation & scaling are performed

**Step 7:** If choice = 3 two successive scaling and rotation are performed

**Step 8:** Stop the process.

**Ex. No. 12**

**3D Composite Transformation**

**Aim:**

To create a cube and apply 3D composite transformations like Scaling, Rotation and Translation.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using initgraph()

**Step 3:** Initialize the variables

**Step 4:** Enter the choice for transformation

**Step 5:** If choice = 1 two successive translation & rotation are performed

**Step 6 :** If choice = 2 two successive translation & scaling are performed

**Step 7:** If choice = 3 two successive scaling and rotation are performed

**Step 8:** Stop the process.

**Ex. No. 13**

**Visible Surface Detection**

**Aim:**

To create a pyramid structure as wire frame display and detect visible surfaces.

**Algorithm:**

**Step 1:** Include the graphics header file

**Step 2:** Initialize graphics using initgraph()

**Step 3:** Initialize the variables

**Step 4:** Enter the choice for detection.

**Step 5:** Draw a wire frame pyramid structure using line() function.

**Step 6 :** Use scan line method to detect points to be removed.

**Step 7:** calculate end points  $x_1, y_1, x_2, y_2, x_3, y_3$  to detect all points visible from wire frame pyramid

**Step 8:** Display visible surface using line() function.

**Step 9:** Stop the 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.

## DATA WAREHOUSING AND DATA MINING LAB

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>MCA 345</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>1</b>

**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:

<b>IA</b>				<b>EE</b>	
<b>A</b>	<b>PR</b>	<b>LR</b>	<b>V</b>	<b>PR</b>	<b>V</b>
5	10	10	5	35	35

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

## OPEN SOURCE TECHNOLOGY LAB

Course Code	L	T	P	Credit
MCA 346	-	-	2	1

### Course Objective:

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

### Course Contents:

1. Write the process of installation of XML & DRUPAL
2. Write programs to print all details of your DTD.
3. Write a program to give demo of XSLT command.
4. Write a program sort ten number by using array.
5. Create a database in MySql and connect that database from XML.
6. Write a program to Update, insert and delete the values of 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.

# NETWORK FUNDAMENTALS LAB

Course Code	L	T	P	Credit
MCA 347	-	-	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.

## REPORT ON WORKSHOP/ SOCIAL WORK

Course Code	L	T	P	Credit
MCA 351	-	-	-	1

**Objective:** Conferences / Seminars / Workshop are good and efficient way to get to know other researchers through their work and also personally. The educational aspect can expose the students to new ways of conducting the business and help them to discover how to be more productive. They provide a great opportunity to network. Collaboration is the way to approach networking.

### Rules and Regulations

- 2<sup>nd</sup> Year / 3<sup>rd</sup> Year Students for which the students and the faculty members can start preparations well in advance prior to the scheduled conference / seminar / workshop.
- The number of students going for any conference / seminar / workshop should be manageable.
- A proposal for the proposed conference / seminar / workshop should be drafted and presented to the HoI reflecting the following key points:
  - Entire activity plan
  - Route Map
  - What are the objectives for the students?
  - What they need to learn, do, and prepare before the conference / seminar / workshop?
  - List of prospective students with Contact Details
  - List of Faculty Coordinators with Contact Details
- After getting approval from the HoI, a note sheet should be prepared and all necessary permission and approval from the competent authorities should be obtained.
- The attention and co-operation of all students and parents are requested to attend the conference / seminar / workshop most effectively. Signing of the letter of Indemnity Bond (Consent-cum-Undertaking) is mandatory for all the parents of students going for conference / seminar / workshop in or outside Jaipur. Duly executed Indemnity Bond should be submitted to HoI Office at least 2 days prior to the visit, without which the accompanying Staff coordinator shall not permit the student to participate in the industrial visit
- The list of students participating in conference / seminar / workshop shall be handed over to the concerned HODs, Staff coordinators.
- Students should be present in formals.
- Students should carry the College Identity Cards during their journey.
- Discipline should be maintained during the conference / seminar / workshop. Any violation will be viewed very seriously.
- A report of the conference / seminar / workshop is to be submitted in 5 days time by students / faculty coordinators once the students are back.

The report to be prepared should reflect the following:-

- What happened at the conference / seminar / workshop the students attend and how does it relate in the best way to the preparations and the learning objectives.
- How do the students will use the outcome of conference / seminar / workshop after it is over?
- What will they gain from it and how can they set up activities that transfer the experience into learning?
- Evaluation parameters for the success of the experience of conference / seminar / workshop.

## **The layout guidelines for the 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

## **ASSESSMENT OF THE INTERNSHIP FILE**

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Report 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.

### **Examination Scheme:**

<b>Components</b>	<b>V</b>	<b>S</b>	<b>R</b>	<b>FP</b>
<b>Weightage (%)</b>	20	20	20	40

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

## COMMUNICATION SKILLS – III

Course Code	L	T	P	Credit
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)**

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>BSS313</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>

### **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:**

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

**Text & References:**

- Organizational Behaviour, Davis, K.
- Hoover, Judith 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

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>FLT311</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>

### 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 ses 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:

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

### Text & References:

- le livre à suivre: Campus: Tome 1

## GERMAN – III

Course Code	L	T	P	Credit
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

Course Code	L	T	P	Credit
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

Course Code	L	T	P	Credit
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 “hui” 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 “cai” (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:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	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 & PROJECT MANAGEMENT

Course Code	L	T	P	Credit
MCA 401	2	1	-	3

## **Module I: Introduction to Software Engineering and Project Management**

Introduction to Software Engineering: Software, Evolving role of software, Three “R”-Reuse, Reengineering and Retooling, An Overview of IT Project Management: Define project, project management framework, the role of project Manager, Systems View of Project Management, Stakeholder management, Project phases and the project life cycle.

## **Module II: Software Development Life Cycle Models**

Overview of Software Development Life Cycle, Process Models: Waterfall Model, Evolutionary Process Model: Prototype and Spiral Model, Incremental Process model: Iterative approach, RAD, JAD model, Concurrent Development Model, Agile Development: Extreme programming, Scrum.

## **Module III: Software Requirement Analysis and Specification**

Types of Requirement, Feasibility Study, Requirement Analysis and Design: DFD, Data Dictionary, Requirement Elicitation: Interviews, Questionnaire, Brainstorming, Facilitated Application Specification Technique (FAST), Use Case Approach. SRS Case study, Software Estimation: Size Estimation: Function Point (Numerical). Cost Estimation: COCOMO (Numerical), COCOMO-II (Numerical), Earned Value Management.

## **Module IV: Software Project Planning**

Business Case, Project selection and Approval, Project charter, Project Scope management: Scope definition and Project Scope management, Creating the Work Breakdown Structures, Scope Verification, Scope Control.

## **Module V: Project Scheduling and Human Resource management**

Relationship between people and Effort: Staffing Level Estimation, Effect of schedule Change on Cost, Degree of Rigor & Task set selector, Project Schedule, Schedule Control, CPM (Numerical), Human Resource Planning, Acquiring the Project Team, Resource Assignment, Loading, Leveling, Developing the Project Team: Team Structures, Managing the Project Team.

## **Module VI: Software Quality and Risk Management**

Software quality, software reliability models, Overview of ISO 9001, SEI Capability Maturity Model, McCalls Quality Model, Six Sigma, Formal Technical Reviews, Tools and Techniques for Quality Control, Quality Control Charts, Modern Quality Management, Risk Management: Identify IT Project Risk, Risk Analysis and Assessment, Risk Strategies, Risk Monitoring and Control, Risk Response and Evaluation.

## Module VII: Software Maintenance

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

### 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*

- *Software Engineering, 5th and 7th edititon, by Roger S Pressman, McGraw Hill publication*
- *Software Engineering Project Management by Richard H. Thayer Wiley India Publication.*

#### *References:*

- <https://www.rgpvnotes.in/2018/01/cs-6003-software-engineering-project.html>  
(Online Tutorial)

## ADVANCED JAVA

Course Code	L	T	P	Credit
MCA 402	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

# DISTRIBUTED OPERATING SYSTEM

Course Code	L	T	P	Credit
MCA 403	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 AND PROJECT MANAGEMENT LAB

Course Code	L	T	P	Credit
MCA421	-	-	2	1

### Course Contents:

### Lab Exercises:

1. Phases in software development project, overview, need, stakeholders of project.
2. Develop requirements specification for a given problem
3. To perform the system analysis : Requirement analysis, SRS
4. To perform the function oriented diagram: DFD and Structured chart.
5. Develop UML Use case model for a problem.
6. Develop PERT chart for scheduling of project
7. Develop Gantt chart for resource allocation of project
8. To draw the behavioral view diagram : State-chart diagram, Activity diagram
9. To draw the implementation view diagram: Component diagram
10. To draw the environmental view diagram : Deployment diagram
11. To perform various testing using the testing tool unit testing, integration testing
12. Using one project management tool -Libra

### Examination Scheme:

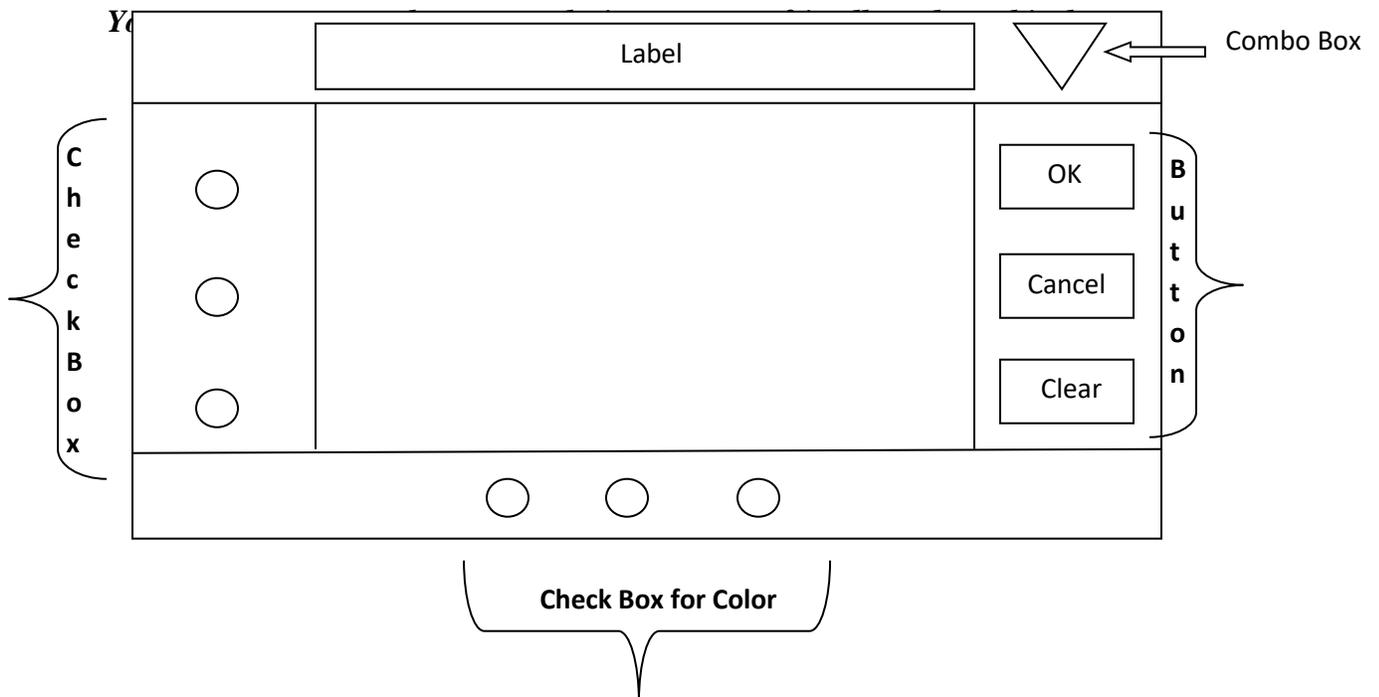
IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

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

## ADVANCED JAVA LAB

Course Code	L	T	P	Credit
MCA 422	-	-	2	1

1. WAP to create frame window from within an applet using AWT.
2. WAP to use all the mouse events (click, entered, exit, pressed, released, dragged, and move) in both child and applet windows using AWT. The event will display the windows X axis and Y axis coordinates.
3. WAP to demonstrate the color (user defined) using applet.
4. WAP to display the available fonts using AWT.
5. WAP to create a calculator using AWT with following criteria.
  - a. Label: Calculator name
  - b. Combo Box: Operation to be performed (Addition, Subtraction, Multiplication and Division).
  - c. Left Side Check Box: Used to include style.
  - d. Bottom Side Check Box: Used to include color.
  - e. Right Side Button: Specific Task.
  - f. Central part: Include button for numerical values and display results.



6. Write a java program to handle an event in a Swing.
7. Write a java program to show simple swing based applet.

8. Perform the question number 5 with the help of swings. At the same time use their components.
9. WAP that implement a simple servlet program.
10. Write a servlet program that reads servlet parameters.
11. Write a servlet program to handle HTTP request and response.
12. Write a servlet program to show the session tracking.
13. Write a JSP program to show the use of their expression, scriptlets and declaration.
14. Write a JSP program to show the use of predefined java class.
15. Write a JSP program to show the use of built in objects.
16. Write a JSP program to include other files with JSP.
17. Write a JSP program to show the utility of Textbox, Button, Radio Button, and Checkbox.
18. WAP for authentication, which validate the First\_Name and Second\_Name by the JSP.
19. WAP to read data send by a client (HTML page) using JSP.
20. Write a JSP program to show the utility of cookies.
21. Create a Sign Up/Sign In page in java with database connectivity using oracle 10g. Include necessary functionality to demonstrate their work.

**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.

## MINOR PROJECT

Course Code	L	T	P	Credit
MCA 450	-	-	-	6

### 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

# CLOUD COMPUTING

Course Code	L	T	P	Credit
MCA 431	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	Quiz	Presentation	Assignment	Attd	EE
Weightage (%)	5	10	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.

## SOFT COMPUTING

Course Code	L	T	P	Credit
MCA 432	2	1	-	3

### Course Objective:

Soft computing has emerged as one of the vital fields within computer science, where solutions for a complex problem can be obtained by incorporating certain processes resembling biological and nature- inspired phenomena. These processes are used intelligently in places where solutions cannot be obtained especially in polynomial time and often remain intractable to conventional mathematical and analytical methods.

### Course Contents:

#### Introduction to Soft Computing

Introduction, Fuzzy Computing, Neural Computing, Genetic Algorithms, Associative Memory, Adaptive Resonance Theory, Applications

#### Fundamentals of Neural Network

Introduction, Model of Artificial Neuron, Architectures, Learning Methods, Taxonomy of NN Systems, Single-Layer NN System, Applications.

#### Back Propagation Network

Background, Back-Propagation Learning, Back-Propagation Algorithm.

#### Associative Memory

Description, Auto-associative Memory, Bi-directional Heteroassociative

#### Fundamentals of Genetic Algorithms

Introduction, Encoding, Operators of Genetic Algorithm, Basic Genetic Algorithm.

#### Swarm Intelligent System

Introduction to swarm intelligence, Background, ACO, ABC, Cuckoo search algorithms.

### Examination Scheme:

Components	CT1	CT2	A/C/Q	Attd	EE
Weightage (%)	10	10	05	5	70

### Text & References:

Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S. Rajasekaran, G. A. Vijayalakshami, PHI.

- Chin Teng Lin, C. S. George Lee, Neuro-Fuzzy Systems, PHI
- Tomthy Ross, Fuzzy Logic and Engineering Application, TMH
- Kishan Mehrotra, Elements of Artificial Neural Network, MIT Press
- E. Goldberg, Genetic Algorithms: Search and Optimization, Addison-Wesley
- Recent Articles and Research papers

# HIGH PERFORMANCE COMPUTING

Course Code	L	T	P	Credit
MCA 433	2	1	-	3

## Course Objective:

The objective of this course is to learn how to improve the quality of the programs that you write for execution on high performance computer systems. The course discusses the various activities that happen during program execution, and how they are managed by the hardware (architectural features) and system software (operating systems, run-time systems).

## Course Contents:

### Module I Program execution

Program, Compilation, Object files, Function call and return, Address space, Data and its representation.

### Module II Computer organization

Memory, Registers, Instruction set architecture, Instruction processing.

### Module III Pipelined processors

Pipelining, Structural, data and control hazards, Impact on programming. Virtual memory: Use of memory by programs, Address translation, Paging. Cache memory: Organization, impact on programming, virtual caches.

### Module IV Operating systems

Processes and system calls, Process management Program profiling. File systems: Disk management, Name management, Protection. Parallel architecture: Inter-process communication, Synchronization, Mutual exclusion, Basics of parallel architecture, Parallel programming with message passing using MPI.

## Examination Scheme:

Components	CT1	CT2	A/C/Q	Attd	EE
Weightage (%)	10	10	05	5	70

## Text:

- J. L. Hennessy and D. A. Patterson, Computer Architecture: A Quantitative Approach, Morgan Kaufmann.

## References:

- A. Silberschatz, P. B. Galvin, G. Gagne, Operating System Concepts, John Wiley.
- R. E. Bryant and D. R. O'Hallaron, Computer Systems: A Programmer's Perspective, Prentice Hall.

## Web References:

- <http://nptel.ac.in/syllabus/106108055/>

## EMBEDDED SYSTEMS

Course Code	L	T	P	Credit
MCA 434	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

## ACCESSING THE WAN

Course Code	L	T	P	Credit
MCA 435	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:**

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

### **Text & References:**

#### *Text*

- Cisco Networking Academy Programme CCNA 4 Companion Guide, 3<sup>rd</sup> Edn by Pearson Education.
- Cisco Networking Academy Programme CCNA 4 Lab Companion, 3<sup>rd</sup> Edn by Pearson Education.
- CISCO CCNA-Exploration 4.0, Module 4, Pearson Education.

#### *References:*

- Cisco Networking Academy Programme CCNA 4 Engineering General, 3<sup>rd</sup> Edn by Pearson Education

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

## ASP.NET USING C#

Course Code	L	T	P	Credit
MCA 436	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.

## PHP

Course Code	L	T	P	Credit
MCA 437	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 XAMPP, PHP, MySQL, Configuring Apache for PHP, Introduction to PHP, 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.

**Module II: 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 III: PHP and My SQL**:Introducing databases Connect MySQL, Creating new database MySQL Create, Creating database table MySQL Insert, SQL data types, Inserting table data, Altering an existing table, Updating records, Deleting data, tables and databases, SQL Queries MySQL Select, MySQL Where, MySQL Order By, MySQL Update, MySQL Delete,, 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

**Module IV: Advance PHP** : Declaring a class and Objects, The new keyword and constructor, Destructor, Access method and properties using \$this variable, Public ,private, protected properties and methods, Static properties and method, Class constant, 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 – V: Content Management System

Introduction of Content Management System, Introduction about WordPress, WordPress.org vs. WordPress.com Introduction about drupal, Drupal installation, Maintenance mode, Working with plugins, Working with themes, Updation and deletion plugins, Upgrade the drupal versions, Forum Social media buttons, Slide show, Comments, Audio and video file in drupe, You tube in your drupal site

**Examination Scheme:**

<b>Components</b>	<b>CT</b>	<b>HA/V/Q</b>	<b>Attd</b>	<b>EE</b>
<b>Weightage (%)</b>	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>

# ROUTING PROTOCOL AND CONCEPT

Course Code	L	T	P	Credit
MCA 438	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:**

<b>Components</b>	<b>CT1</b>	<b>A/C/Q</b>	<b>ATTD.</b>	<b>EE</b>
<b>Weightage (%)</b>	15	10	5	70

### **Text & References:**

#### ***Text:***

- Cisco Networking Academy Programme CCNA 1 & 2 Companion Guide, 3<sup>rd</sup> Edn by Pearson Education
- Cisco Networking Academy Programme CCNA 1 & 2 Lab Companion, 3<sup>rd</sup> Edn by Pearson Education
- Cisco Networking Academy Programme CCNA 1 & 2 Engineering General, 3<sup>rd</sup> Edn by Pearson Education

#### ***References:***

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

# STATISTICAL ANALYSIS USING R

Course Code	L	T	P	Credit
MCA 439	2	1	-	3

## Course Objective:

Statistical learning refers to a set of tools for modeling and understanding complex datasets. It is a recently developed area in statistics and blends with parallel developments in computer science and, in particular, machine learning. The field encompasses many methods such as the lasso and sparse regression, classification and regression trees, and boosting and support vector machines. an introduction to the basic principles, techniques, and applications of Artificial Intelligence.

## Course Contents:

### Introduction

What Is Statistical Learning, Why Estimate  $f$ , How Do We Estimate  $f$ , The Trade-Off Between Prediction Accuracy and Model Interpretability, Supervised Versus Unsupervised Learning, Regression Versus Classification Problems, Assessing Model Accuracy, Measuring the Quality of Fit, The Bias-Variance Trade-Off, The Classification Setting

### Linear Regression

Simple Linear Regression, Estimating the Coefficients, Assessing the Accuracy of the Coefficient Estimates, Assessing the Accuracy of the Model, Multiple Linear Regression, Estimating the Regression Coefficients, Comparison of Linear Regression with K-Nearest Neighbors.

### Classification

An Overview of Classification, Why Not Linear Regression, Logistic Regression, The Logistic Model, Estimating the Regression Coefficients, Making Predictions, Multiple Logistic Regression, Logistic Regression for  $>2$  Response Classes, Linear Discriminant Analysis, Using Bayes' Theorem for Classification.

### Resampling Methods

Cross-Validation, The Validation Set Approach, Leave-One-Out Cross-Validation, k-Fold Cross-Validation, Bias-Variance Trade-Off for k-Fold Cross-Validation, Cross-Validation on Classification Problems, The Bootstrap.

### Linear Model Selection and Regularization

Subset Selection, Best Subset Selection, Stepwise Selection, Choosing the Optimal Model, Shrinkage Methods, Ridge Regression, The Lasso, Selecting the Tuning Parameter, Dimension Reduction Methods, Principal Components Regression, Partial Least Squares, Considerations in High Dimensions, High-Dimensional Data, What Goes Wrong in High Dimensions? Regression in High Dimensions, Interpreting Results in High Dimensions

## Support Vector Machines

Maximal Margin Classifier ,What Is a Hyper plane? Classification Using a Separating Hyper plane , The Maximal Margin Classifier ,Construction of the Maximal Margin Classifier .The Non-separable Case , Support Vector Classifiers , Overview of the Support Vector Classifier , Details of the Support Vector Classifier , Support Vector Machines ,Classification with Non-linear Decision Boundaries , The Support Vector Machine , An Application to the Heart Disease Data.

### Examination Scheme:

Components	CT	A/Q	Attd	EE
Weightage (%)	15	05	5	70

### Suggested Reading

1. Introduction to Statistics and Data Analysis - With Exercises, Solutions and Applications in R By Christian Heumann, Michael Schomaker and Shalabh, Springer, 2016
2. The R Software-Fundamentals of Programming and Statistical Analysis -Pierre Lafaye de Micheaux, Rémy Drouilhet, Benoit Liquet, Springer 2013
3. A Beginner's Guide to R (Use R) By Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, Springer 2009

## ASP.NET USING C# LAB

Course Code	L	T	P	Credit
MCA 446	-	-	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.

## PHP LAB

Course Code	L	T	P	Credit
MCA 447	-	-	2	1

Course Code: MCA422

P:02 C:01

### Course Contents:

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

### 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

Course Code	L	T	P	Credit
MCA 448	-	-	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

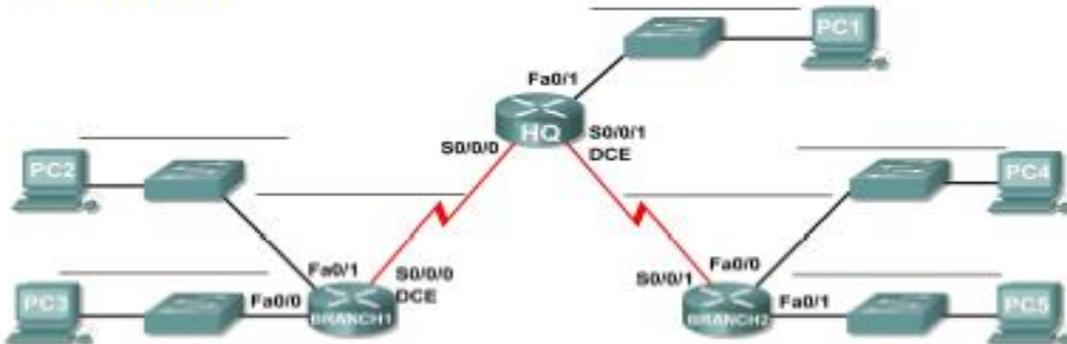
- Cable a network according to the Topology Diagram given by Lab Coordinator
- Erase the startup configuration and reload a router to the default state.
- Perform basic configuration tasks on a router.
- Interpret **debug ip routing** output.
- Configure and activate Serial and Ethernet interfaces.
- 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

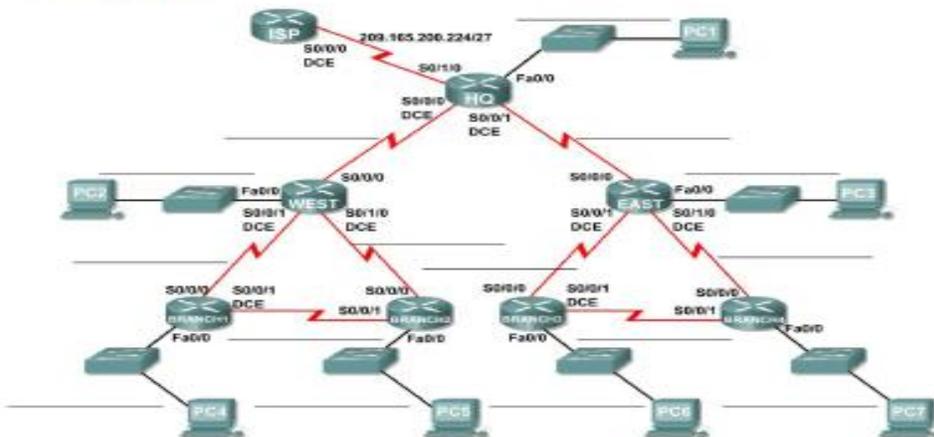
Topology Diagram



- 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.

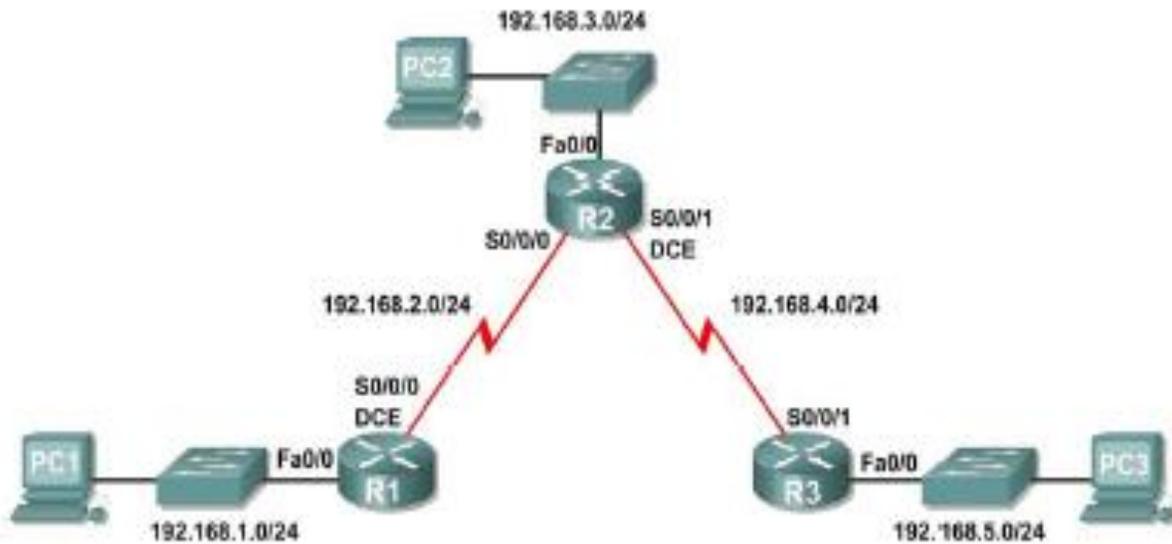
- Verify RIP routing using **show** and **debug** commands.
- Reconfigure the network to make it contiguous.
- Observe automatic summarization at boundary router.
- Gather information about RIP processing using the **debug ip rip** command.
- Configure a static default route.
- Propagate default routes to RIP neighbors.
- Document the RIP configuration.

## Scenarios

- Scenario A: Running RIPv1 on Classful Networks

### Scenario A: Running RIPv1 on Classful Networks

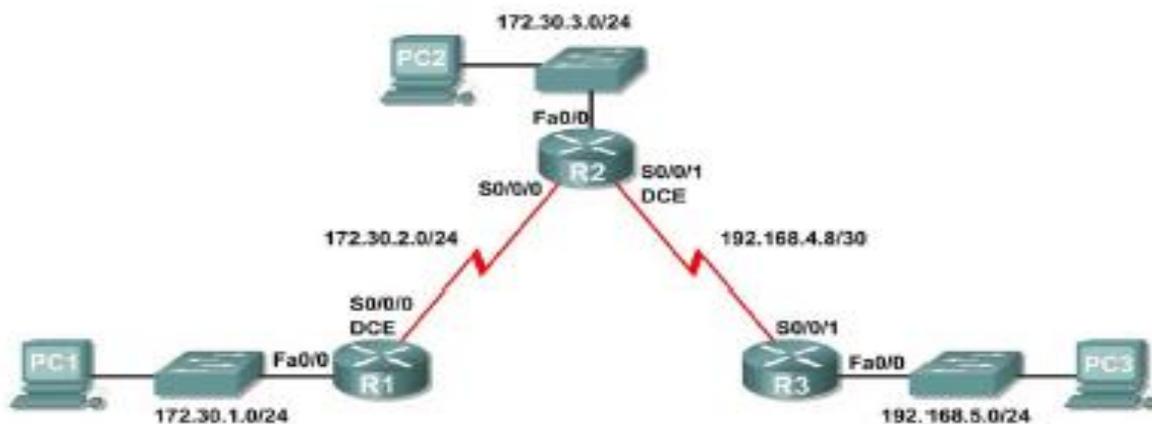
#### Topology Diagram



- Scenario B: Running RIPv1 with Subnets and Between Classful Networks

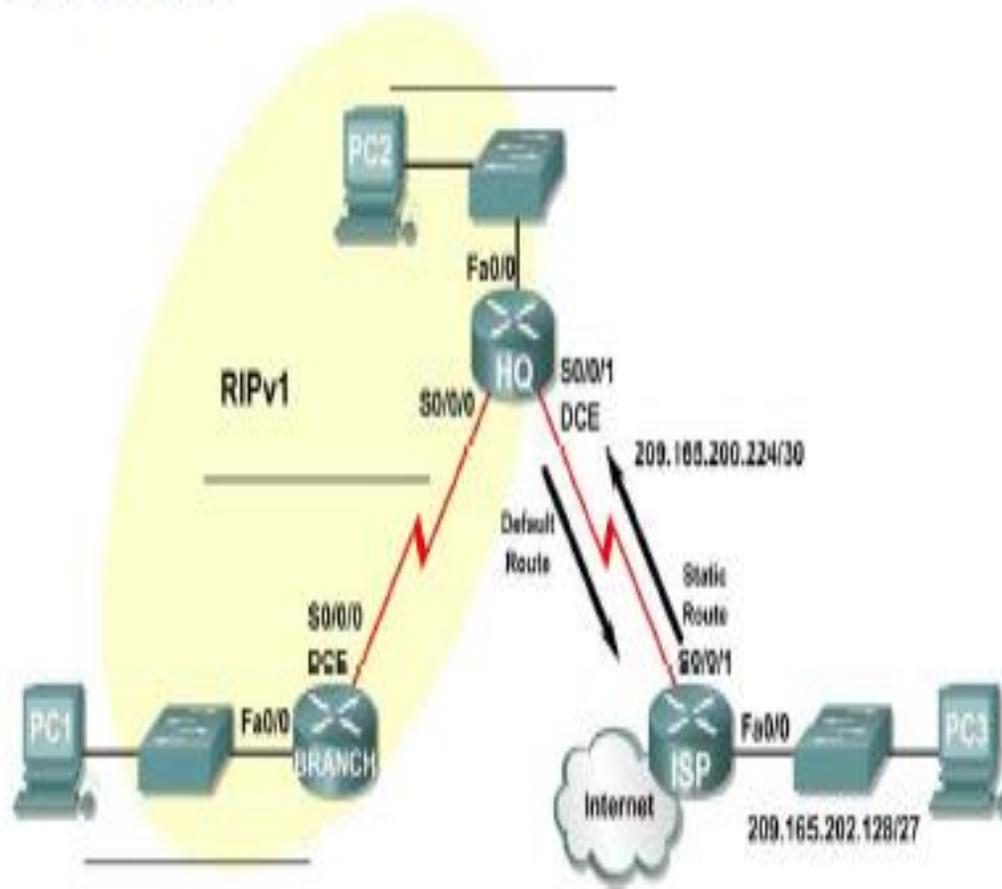
### Scenario B: Running RIPv1 with Subnets and Between Classful Networks

#### Topology Diagram



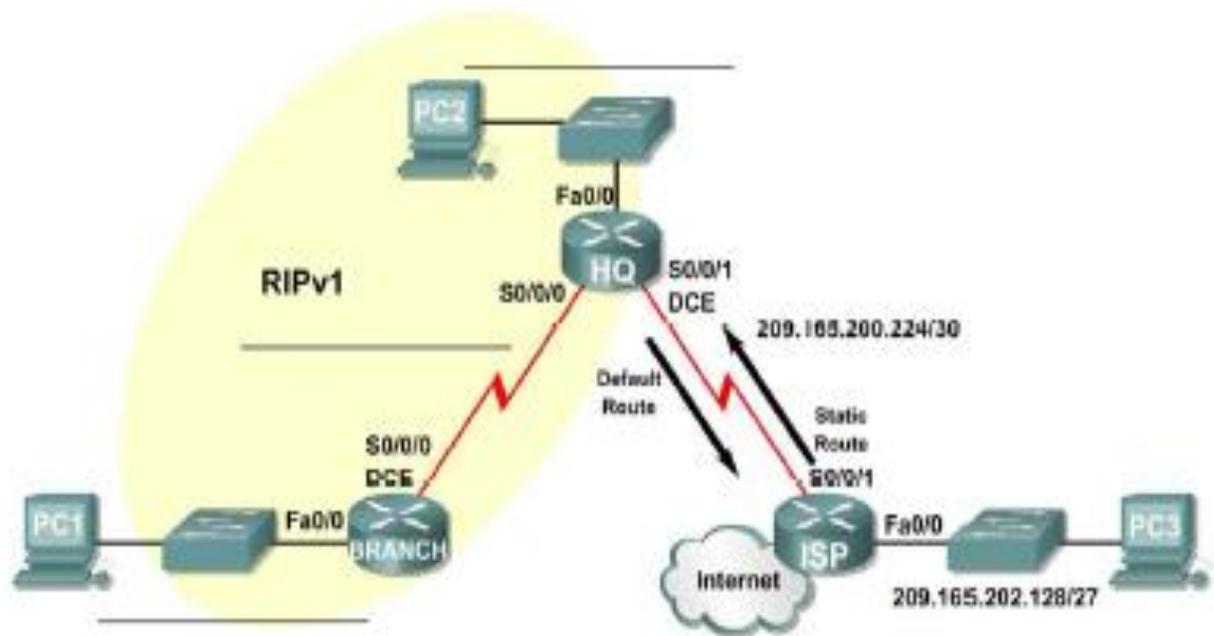
Scenario C: Running RIPv1 on a Stub Network

## Topology Diagram



## 10.0 Challenge RIPv1 Configuration

### Topology Diagram

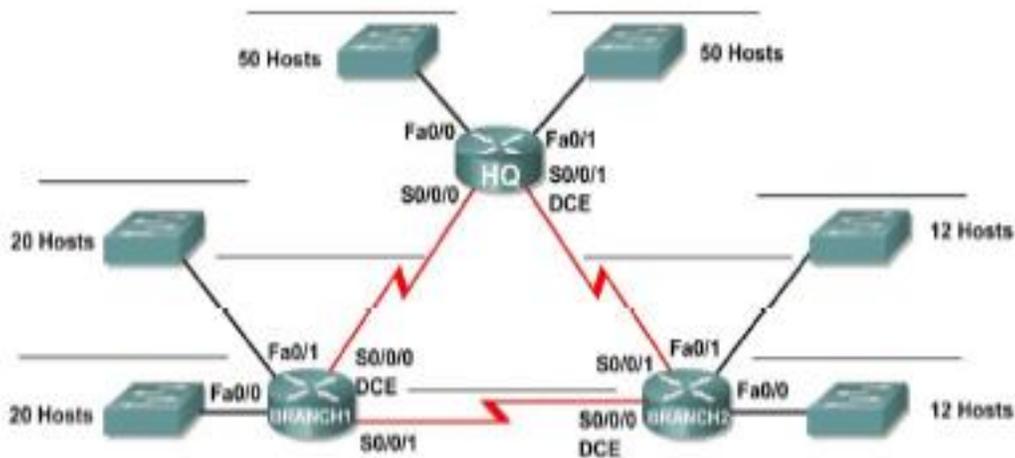


Subnet an address space given requirements.

- 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

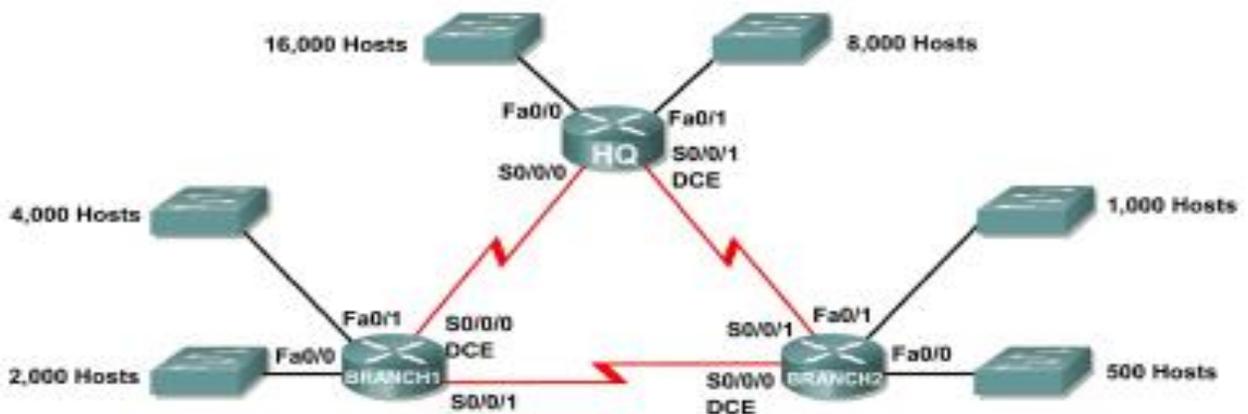
Topology Diagram



- 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

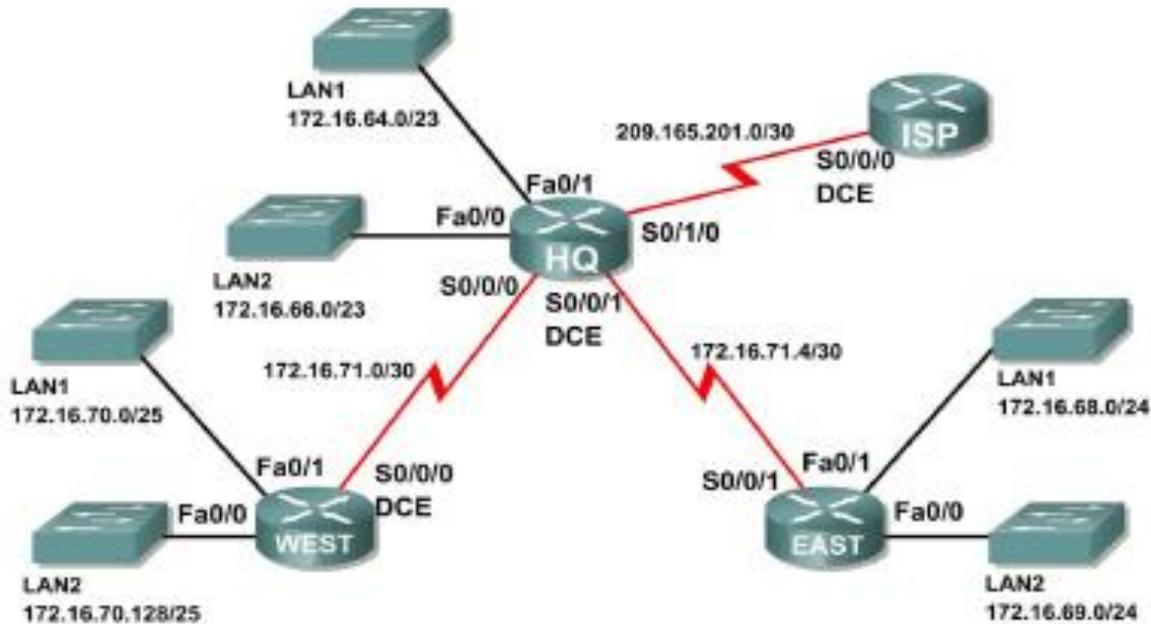


- Discover errors in a VLSM design.
- Propose solutions for VLSM design errors.

- Document the corrected VLSM assignments.

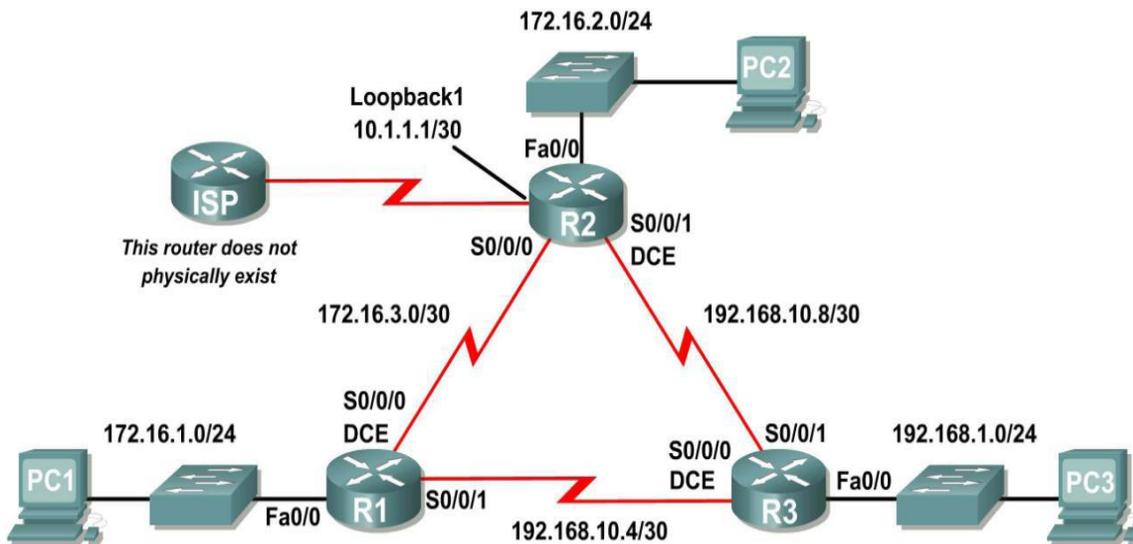
### 13.0 Basic Route Summarization

#### Topology Diagram



Determine summarized routes that can be used to reduce the size of routing tables

### 15.0 Basic EIGRP Configuration Lab

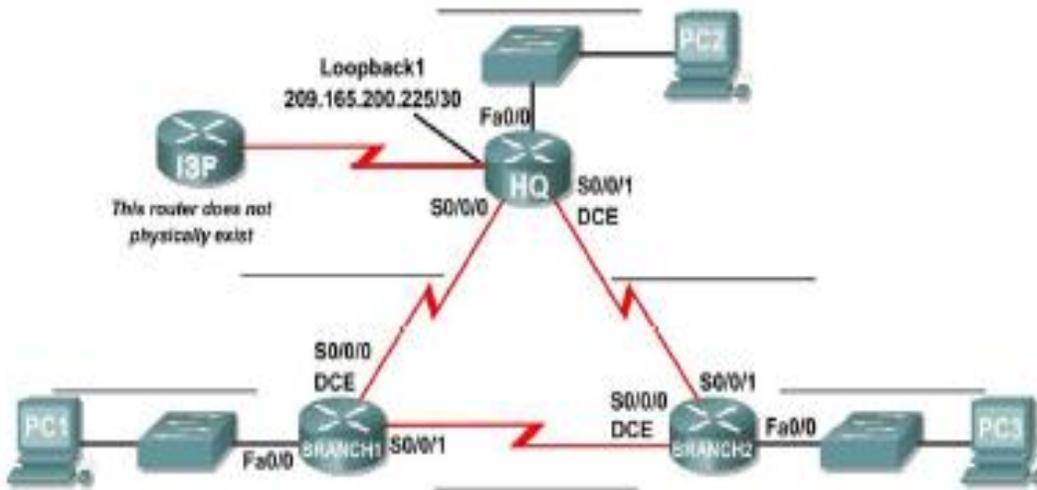


- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Perform basic configuration tasks on a router.
- Configure and activate interfaces.
- Configure EIGRP routing on all routers.
- Verify EIGRP routing using **show** commands.
- 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

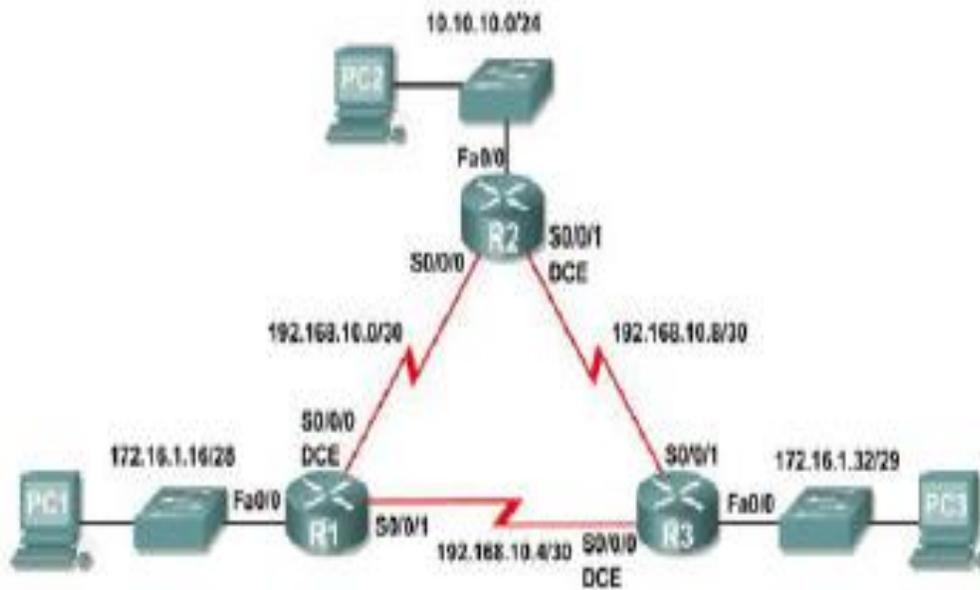


- Create an efficient VLSM design given requirements.
- Assign appropriate addresses to interfaces and document.
- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Configure routers including EIGRP.
- Configure and propagate 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.

## STASTICAL ANALYSIS USING R LAB

Course Code	L	T	P	Credit
<b>MCA 449</b>	-	-	<b>2</b>	<b>1</b>

1. Introduction to R , Basic Commands , Graphics , Indexing Data , Loading Data ,Additional Graphical and Numerical Summaries,
2. Linear Regression , Libraries, Simple Linear Regression, Multiple Linear Regression, Writing Functions
3. Logistic Regression, LDA, QDA, and KNN , The Stock Market Data , Logistic Regression, Linear Discriminant Analysis, K-Nearest Neighbors.
4. Cross-Validation and the Bootstrap, The Validation Set Approach, Leave-One-Out Cross-Validation, k-Fold Cross-Validation , The Bootstrap.
5. Subset Selection Methods , Best Subset Selection, Forward and Backward Stepwise Selection, Choosing Among Models Using the Validation Set Approach and Cross-Validation.
6. Ridge Regression and the Lasso, Ridge Regression, The Lasso, PCR and PLS Regression, Principal Components Regression, Partial Least Squares.
- 7.Support Vector Machines, Support Vector Classifier, Support Vector Machine, ROC Curves, SVM with Multiple Classes.

### Examination Scheme:

<b>IA</b>				<b>EE</b>	
<b>A</b>	<b>PR</b>	<b>LR</b>	<b>V</b>	<b>PR</b>	<b>V</b>
5	10	10	5	35	35

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

## COMMUNICATION SKILLS – IV

Course Code	L	T	P	Credit
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)**

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>BSS413</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>

### **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:**

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

### **Text & References:**

- 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
- Raman, A.T. (2003) Knowledge Management: A Resource Book. Excel Books, Delhi.
- Kamalavijayan, D. (2005). Information and Knowledge Management. Macmillan India Ltd. Delhi

# FOREIGN LANGUAGE

## FRENCH – IV

Course Code	L	T	P	Credit
FLT411	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

Course Code	L	T	P	Credit
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:

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	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

Course Code	L	T	P	Credit
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

Course Code	L	T	P	Credit
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

Course Code	L	T	P	Credit
MCA 501	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. Graduate students are expected to develop some familiarity with current research problems and research methods in AI by working on a research or design project.

## 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\*, AO\* algorithm, constraint satisfaction, and beam search.

### Module IV: Knowledge Representation issues using predicate logic

Representation and mapping, knowledge representation mechanism, inheritable knowledge, Propositional logic: syntax and semantics, First Order Predicate Logic (FOPL).

### Module V: Expert System

Basic understanding of Fuzzy Logic, Artificial Neural Network, Perceptron, Natural Language Processing, Pattern Recognition, Robotics, LISP and Prolog. The role of Artificial intelligence in Biotechnology. Introduction to Bio-inspired computing.

## Examination Scheme:

Components	CT	A/Q	Attd	EE
Weightage (%)	15	05	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 Gopalakrishnan, Macmillan India Ltd.
- Introduction to AI and Expert System, Dan W. Patterson, PHI.

## INFORMATION STORAGE MANAGEMENT (EMC<sup>2</sup>)

Course Code	L	T	P	Credit
MCA 502	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, Storage 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	Attnd	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

## ARTIFICIAL INTELLIGENCE LAB

Course Code	L	T	P	Credit
MCA 521	-	-	2	1

### LIST OF PROGRAMS

S.NO	PROGRAM
1	Study of PROLOG. Write the following programs using PROLOG
2	Write a program to solve 8 queens problem
3	Solve any problem using depth first search.
4	Solve any problem using best first search.
5	Solve 8-puzzle problem using best first search
6	Solve Robot (traversal) problem using means End Analysis
7	Solve traveling salesman problem.

### Books for Reference :

- Artificial Intelligence: A Modern Approach,. Russell & Norvig. 1995, Prentice Hall.
- Artificial Intelligence, Elaine Rich and Kevin Knight, 1991, TMH.
- Artificial Intelligence-A modern approach, Stuart Russel and peter norvig, 1998, PHI.
- Artificial intelligence, Patrick Henry Winston:, 1992, Addition Wesley 3 Ed.,
- Introduction to prolog.

### 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.

## MINOR PROJECT

Course Code	L	T	P	Credit
MCA 550	-	-	-	6

### 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:**

<b>Components</b>	<b>MRP</b>	<b>V</b>	<b>S</b>	<b>FP</b>	<b>R</b>
<b>Weightage (%)</b>	20	20	20	20	20

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

## SUMMER INTERNSHIP PROJECT

Course Code	L	T	P	Credit
MCA 551	-	-	-	3

### 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:**

<b>Components</b>	<b>V</b>	<b>S</b>	<b>R</b>	<b>FP</b>
<b>Weightage (%)</b>	20	20	20	40

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

## SEARCH ENGINE OPTIMIZATION

Course Code	L	T	P	Credit
MCA 531	2	1	-	3

**Course Objective:** The course will help the students to understand the basics of search engine optimization and various techniques which can be implemented to optimizing web pages or whole sites in order to make them search engine friendly and also to improve the visibility of the web pages for different search engines.

### Course Contents

#### Module 1

What is SEO?, How Search Engine Works, What is SEO Copywriting?, What is Search Engine Rank?, Ways to optimize web pages (on-page and off-page), Broad Categories of SEO Techniques (White Hat SEO and Black Hat SEO).

#### Module 2

File Naming Style, URL Subdirectory Name, SEO-Design & Layout, Optimized Keywords (Keyword Frequency, Weight, Proximity, Prominence, Placement), best places to keep keywords, finding keywords, Word Stemming.

#### Module 3

Metatags, Title optimization, Best practices for creating titles, Optimized Anchors, Importance of Contents, SEO Content Writing, Verifying Website and its importance, W3C Compliance and their rules.

#### Module 4

Qualities and Task of SEO Expert, Choosing an SEO Expert / Company, Link Building and how to increase link popularity, Mobile SEO and its techniques, Dos and Don'ts of SEO.

#### Examination Scheme:

Components	Presentatio n	Assignment / Case Study	Quiz	Attd	EE
Weightage (%)	10	10	5	5	70

#### *Text and References:*

- Introduction to Search Engine Optimization: A Guide for Absolute Beginners By Todd Kelsey, Brandon Lyon, Apress
- The Art of SEO Mastering Search Engine Optimization By Eric Enge, Stephan Spencer, Jessie Stricchiola, Rand Fishkin, O Reilly Media Inc.
- Search Engine Optimization: Building Traffic and Making Money with SEO by Harold Davis, O Reilly Media Inc.
- Search Engine Optimization (SEO): An Hour a Day By Jennifer Grappone, Gradiva Couzin, John Wiley & Sons
- Search Engine Optimization Bible By Jerri L. Ledford Wiley Publishing Inc.
- Basic Search Engine Optimization Is Fundamental and Essential: Legal Precedants of Search Engine Optimization

## DIGITAL MARKETING ANALYTICS

Course Code	L	T	P	Credit
MCA-532	2	1	-	3

**Course Description** ; With the rapid shift of marketing away from traditional media to online platforms, it is becoming increasingly important for the students to be well-versed in digital marketing fundamentals.

### Digital Marketing : Introduction

Key Concepts of Digital Marketing, Definition of the DMI Method, Principles, Our Tools, The DMI Framework, Traditional v. Digital Marketing, The Opportunity of Digital Marketing, Characteristics of Digital Marketing, Implication of Digital Marketing, Market Research v. Market Reality.

### Search Engine Optimization (SEO)

Key SEO Concepts : Search Results & Position, Benefits of Search Position, Stakeholders in Search, Mechanics of Search, On-Page Optimisation, The SEO Process, Customer Insights, Analysis & Review, Keyword Research & Selection, Content Updates & Layout, Meta Tags, SEO Site Map, SEO Webmaster Tools

### Online Advertising:

MOBILE MARKETING : Mobile Devices, SMS Content, SMS Strategy, Mobile Advertising, Mobile Optimised Websites, Mobile Apps; EMAIL MARKETING : Campaign Process, Online Data Capture, Offline Data Capture, Segmentation, Email Design, User Behavior, User Characteristics, Email Copy, Email Structure, Email Delivery, Email Systems

### Web Analytics

Planning, Situation Analysis, Information Gathering, Target Audience, Analytics Code, Analytics Profiles, Goal Configuration & Funnels, Audience, Dashboard, Technology, Advertising, Adwords Campaigns, Traffic Sources, Laws & Guidelines.

### 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.

### Textbook :

“Beginner’s Textbook for Digital Marketing & Analytics”

Website Link:

- SEOMoz.org
- mashable.com <http://www.convinceandconvert>.
- ClickZ.com
- forrester.com
- contentmarketinginstitute.com

# COMPILER DESIGN

Course Code	L	T	P	Credit
MCA-533	2	1	-	3

## Course Objective:

This course studies the principles of programming languages with an emphasis on programming language implementation and compiler design. This includes various techniques for describing and defining a language, as well as techniques for implementing compilers. The course is centered on a large programming project-the construction of a complete compiler for a small programming language.

## Course Contents:

### Module I: Introduction

Introduction to Compilers, Classification of grammars, Context free grammars, Regular grammars, Deterministic finite State Automata (DFA) & Non-DFA.

### Module II: Syntax Analysis

Scanners, Top down parsing, LL grammars, Bottom up parsing, Polish expression Operator Precedence grammar, IR grammars, Comparison of parsing methods, Error handling.

### Module III: Symbol Table

Symbol table handling techniques, Organization for non-block and block structured languages.

### Module IV: Code Generation/Intermediate Code Generation

Run time storage administration, Static and dynamic allocation, Intermediate forms of source program, Polish N-tuple and syntax trees, Semantic analysis and code generation.

### Module V: Code Optimization

Code optimization, Folding, redundant sub-expression evaluation, Optimization within iterative loops.

## Examination Scheme:

Components	CT1	CT2	A/C/Q	Attd	EE
Weightage (%)	10	10	05	5	70

## Text & References:

### Text:

- Principles of Compiler Design, Alfred V. Aho, Jeffrey D. Ullman, Narosa Publishing House
- Compilers Principles, Techniques & Tools, Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Pearson Education (Singapore)

### References:

- The Theory and Practice of Compiler Writing, Tremblay, et. al., McGraw Hill, New York, 1985.

# DIGITAL IMAGE PROCESSING

Course Code	L	T	P	Credit
MCA-534	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

**Examination Scheme:**

<b>Components</b>	<b>CT1</b>	<b>PR.</b>	<b>ATTD.</b>	<b>EE</b>
<b>Weightage (%)</b>	15	10	5	70

**Text & References:**

**Text:**

- Rafael C. Conzalez & 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”,

## SALESFORCE TECHNOLOGY

Course Code	L	T	P	Credit
MCA 535	2	1	-	3

### Module I

Introduction to Salesforce, Salesforce framework, Salesforce- Sales Cloud and Service Cloud, Salesforce objects, Salesforce - Control Access Organization, Home page components: Working with Home Page Components and Custom Links, features and functionality associated with the Salesforce home page along with HTML, CSS, and JavaScript code. Advanced User Interface and the native Salesforce user interface, add graphical elements by using images, HTML, CSS, JavaScript, and Visualforce.

### Module II

Salesforce CRM: Standard functionality and elements of Salesforce CRM using HTML and JavaScript. Automating Salesforce CRM, data management using Salesforce workflow and formulas. Improving Data Quality in Salesforce CRM, Salesforce CRM validation rule mechanism. Implementation of Approval Processes, Salesforce CRM approval mechanism.

### Module III

Productivity Tools for Superusers and Advanced Administration, custom fields & unique properties Data Utilities, custom reports, storage utilization, Analytics, advanced filters, Create dashboards, The AppExchange, Marketing Administration, integrated campaign builder, Service & Support Administration, the Salesforce Console, custom objects, custom tabs, custom Web tabs, custom app, Applications for Multiple Users, Chatter.

### Module IV

Visualforce framework, Incorporate Visualforce pages into Salesforce and vice versa, Visualforce standard controllers, creating custom controllers or extensions, Designing Applications on Force.com, building a data model, Custom Object tab, Page Layout, and Customization options, Employ OWD, Apply profiles, OWDs, role hierarchy, Apply OWDs, Implementing Business Processes, the vlookup, regex, ischanged, isnew, and priorvalue functions, Managing Data, use of upsert, data management tools and the API-based tools, the Data Loader, create mapping files and upsert data.

### Module V

Sandboxes for development, Configuring and Installing Salesforce for Outlook E-mail Integration, Integrating Salesforce CRM with External Online Tools, using HTML, CSS, JavaScript, and Visualforce. Use Salesforce on Mobile Devices.

### Examination Scheme:

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

### Text & References:

#### Text

- *Force.com Fundamentals by Salesforce Developers Press*
- *Practical Salesforce.com Development Without Code by Philip Weinmeister*

#### References:

- [https://www.tutorialspoint.com/salesforce/salesforce\\_pdf\\_version.htm](https://www.tutorialspoint.com/salesforce/salesforce_pdf_version.htm)  
(Online Tutorial)

## LAN SWITCHING AND WIRELESS

Course Code	L	T	P	Credit
MCA 536	2	1	-	3

### Course Objective:

The goal of CCNA Exploration LAN Switching and Wireless course is to introduce you to develop an understanding of how switches are interconnected and configured to provide network access to LAN users. This course also teaches how to integrate wireless devices into a LAN.

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

### Text & References:

#### Text

- Cisco Networking Academy Programme CCNA 3 & 4 Companion Guide, 3<sup>rd</sup> Edn by Pearson Education
- Cisco Networking Academy Programme CCNA 3 & 4 Lab Companion, 3<sup>rd</sup> Edn by Pearson Education

#### References:

- Cisco Networking Academy Programme CCNA 3 & 4 Engineering General, 3<sup>rd</sup> Edn by Pearson Education
- Data Communications and Networking by Behrouz Forouzan, 3e, Tata McGraw-Hill
- Computer Networks by Andrews S. Tanenbaum, 4e, Pearson Education

# PYTHON

Course Code	L	T	P	Credit
MCA 537	2	1	-	3

## Course Objective:

Evaluate python problems, Elicit, analyze and specify python through programming. Design and Plan software solutions to various problems using python paradigms.

## Course Contents:

### Module I: Python Introduction:

Python Variables, Python Variables, Python Casting, Python Strings, Python Operators, Python Lists, Python Tuples, Python Sets, Python Dictionaries, Python Conditions, Python While Loops & Decision Making Python For Loops, Python Functions.

### Module II: File Handling

Python File Open, Python File Write, Python Delete File

### Module III: Arrays, Matrix, Python – Sets

Python - 2D Array: Accessing Values in a Two Dimensional Array, Inserting Values in Two Dimensional Array, Updating Values in Two Dimensional Array, Accessing Values in a Matrix, Adding a row and column

Set Operations: Creating a set, Accessing Values in a Set, Adding Items to a Set

### Module IV: Linked Lists & Stack, Queue and Tree

PUSH into a Stack, POP from a Stack, Adding and Removing Elements to a Queue, Inserting into a Tree, Traversing a Tree

## Examination Scheme:

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

## Text & References:

### Text:

- Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning, ISBN: 978-1111822705.

### References:

- The Python Tutorial (<https://docs.python.org/3/tutorial/>): This is the official tutorial from the Python website. No more authoritative source is available.
- Code Academy Python Track (<http://www.codecademy.com/tracks/python>): Often cited as a great resource, this site offers an entertaining and engaging approach and in-browser work.

## BIG DATA AND ANALYTICS USING R

Course Code	L	T	P	Credit
MCA538	2	1	-	3

### Course Objective:

This course provides a basic introduction to big data and corresponding quantitative research methods. The objective of the course is to familiarize students with big data analysis as a tool for addressing substantive research questions. The course begins with a basic introduction to big data and discusses what the analysis of these data entails, as well as associated technical, conceptual and ethical challenges.

### Course Contents:

#### Module I: INTRODUCTION TO BIG DATA AND HADOOP

Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere BigInsights and Big Sheets.

#### Module II : HDFS(Hadoop Distributed File System)

The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

#### Module III : Map Reduce

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 Eco System

Pig : Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase : HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. Big SQL : Introduction

#### UNIT V : Data Analytics with R

Reading and getting data into R, ordered and unordered factors, arrays and matrices, lists and data frames, reading data from files, probability distributions, statistical models in R, Manipulating objects, data distribution. Using Machine learning Algorithms with R.

### Examination Scheme:

Components	CT1	PR.	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

# ANDROID PROGRAMMING

Course Code	L	T	P	Credit
MCA539	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

## LAN SWITCHING AND WIRELESS LAB

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>MCA546</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>1</b>

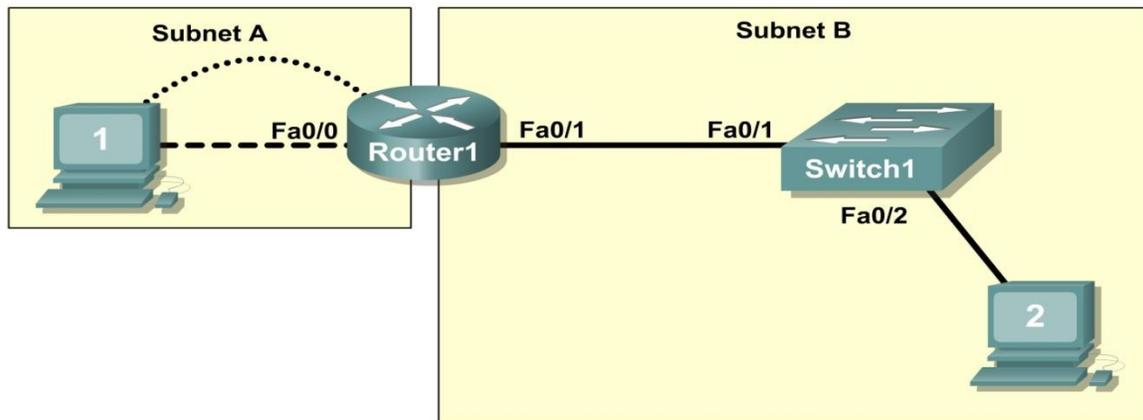
### Course Contents:

#### 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:

<b>Subnet A</b>	
<b>Specification</b>	<b>Value</b>
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

<b>Subnet B</b>	
<b>Specification</b>	<b>Value</b>
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:

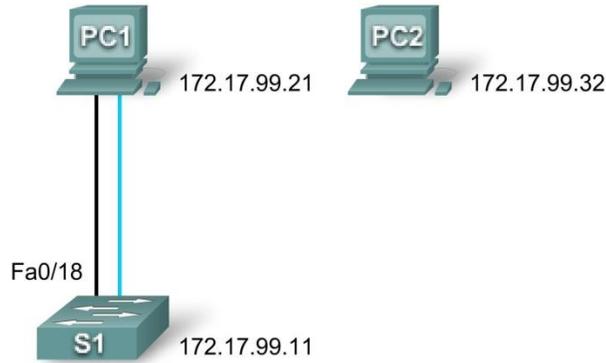
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Create a configuration table similar to the one below using your corrected values:

<b>Device</b>	<b>IP address</b>	<b>Mask</b>	<b>Gateway</b>
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

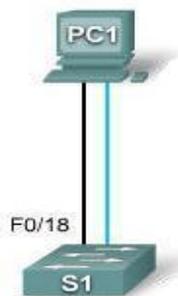
Device	Interface	IP Address	Subnet Mask	Default Gateway
PC1	NIC	172.17.99.21	255.255.255.0	172.17.99.1
PC2	NIC	172.17.99.32	255.255.255.0	172.17.99.1
S1	VLAN99	172.17.99.11	255.255.255.0	172.17.99.1

### 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

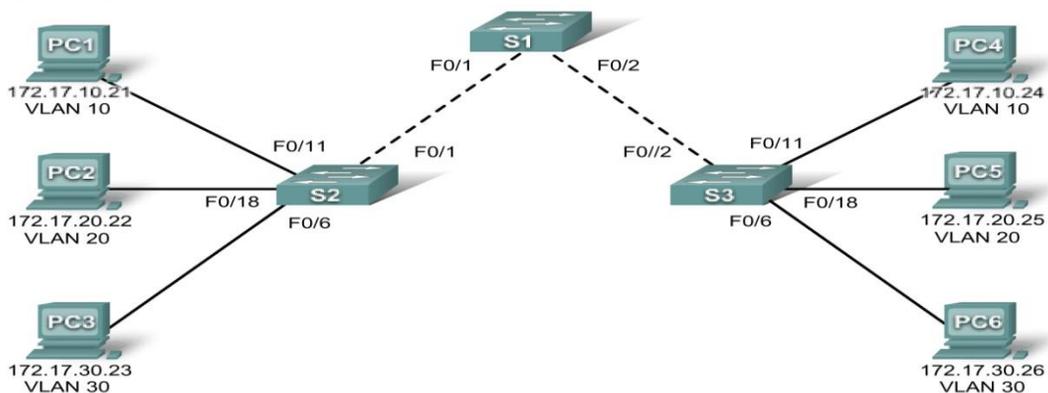
Device	Hostname	Interface	IP Address	Subnet Mask	Default Gateway
PC1	Host-A	NIC	172.17.99.21	255.255.255.0	172.17.99.1
S1	ALSwitch	VLAN99	172.17.99.11	255.255.255.0	172.17.99.1

## 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 (Hostname)	Interface	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

### Initial Port Assignments (Switches 2 and 3)

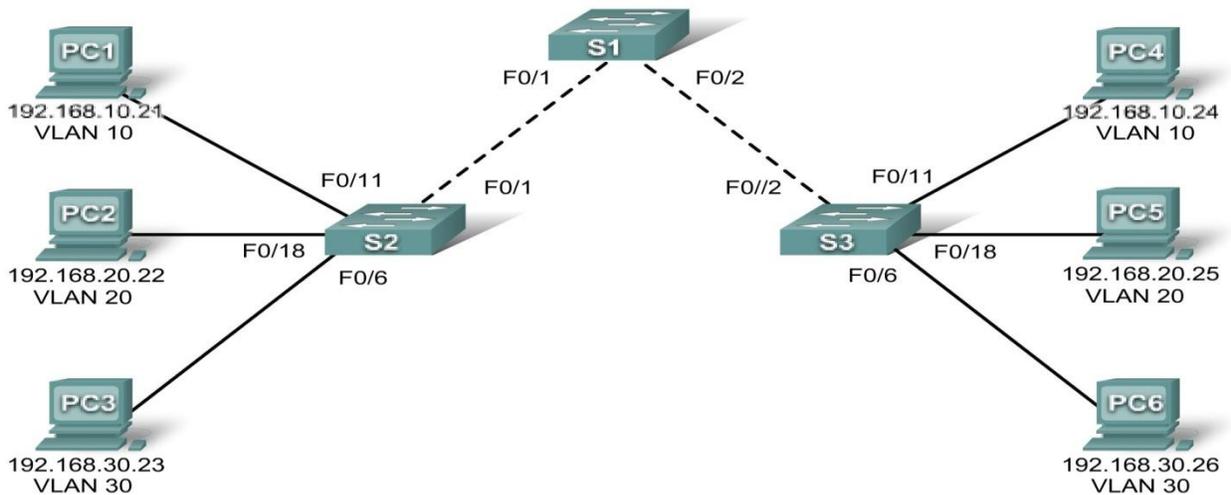
Ports	Assignment	Network
Fa0/1 – 0/5	802.1q Trunks (Native VLAN 99)	172.17.99.0 /24
Fa0/6 – 0/10	VLAN 30 – Guest (Default)	172.17.30.0 /24
Fa0/11 – 0/17	VLAN 10 – Faculty/Staff	172.17.10.0 /24
Fa0/18 – 0/24	VLAN 20 – Students	172.17.20.0 /24

## 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

Device (Hostname)	Interface	IP Address	Subnet Mask	Default Gateway
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

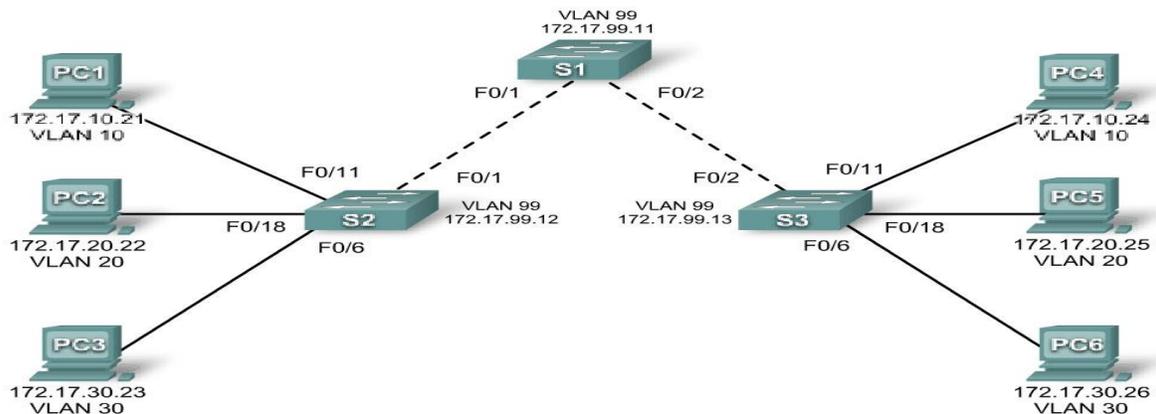
On each switch, capture the running configuration to a text file and save for future reference:

## 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 (Hostname)	Interface	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

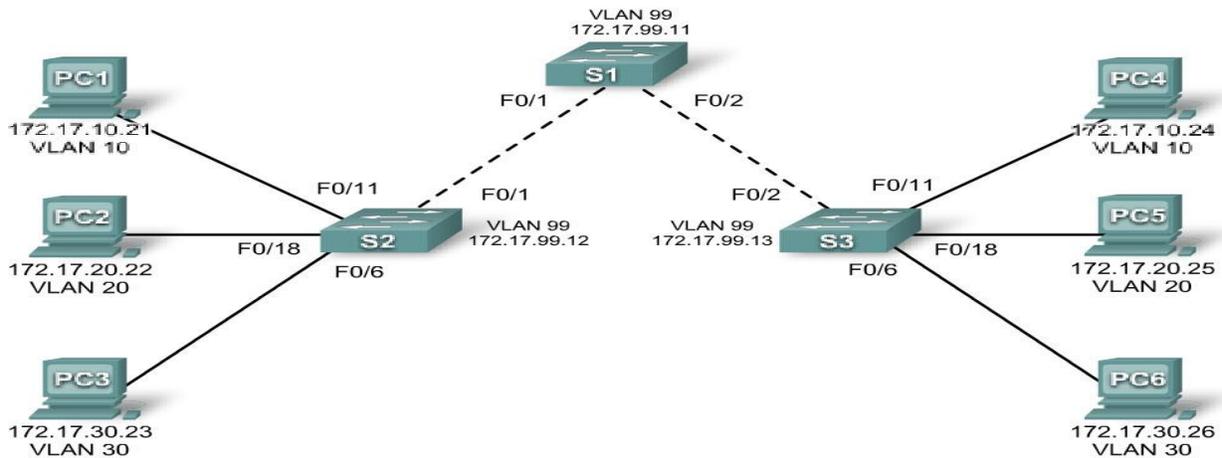
## Port Assignments (Switches 2 and 3)

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 (Hostname)	Interface	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)

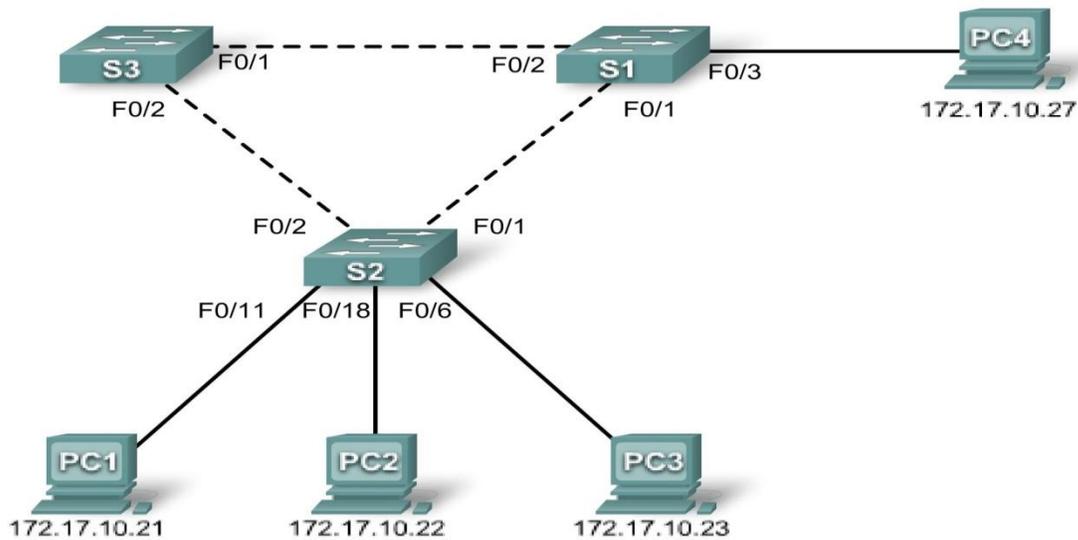
Ports	Assignment	Network
Fa0/1 – 0/5	802.1q Trunks (Native VLAN 99)	172.17.99.0 /24
Fa0/6 – 0/10	VLAN 30 – Guest (Default)	172.17.30.0 /24
Fa0/11 – 0/17	VLAN 10 – Faculty/Staff	172.17.10.0 /24
Fa0/18 – 0/24	VLAN 20 – Students	172.17.20.0 /24

### 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



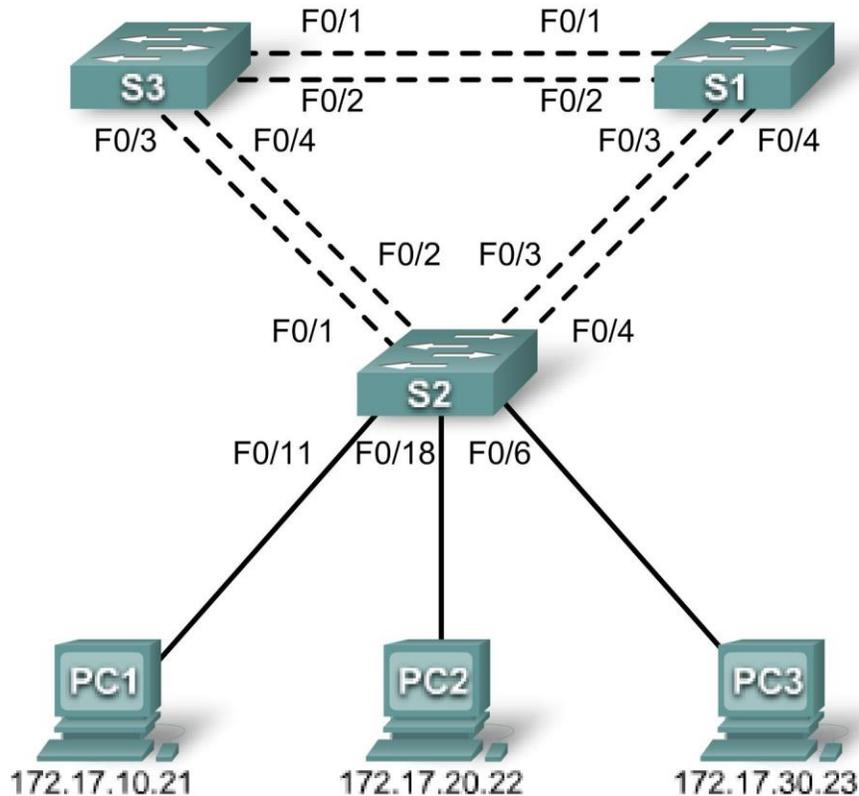
### Addressing Table

Device (Hostname)	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 (Hostname)	Interface	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

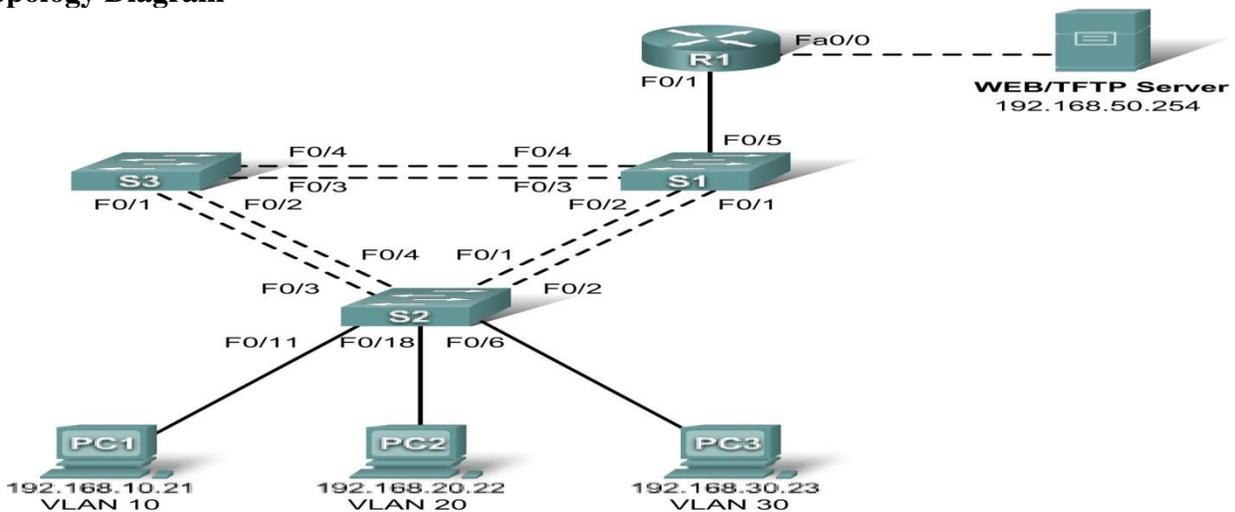
### Learning Objectives

- 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 (Hostname)	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

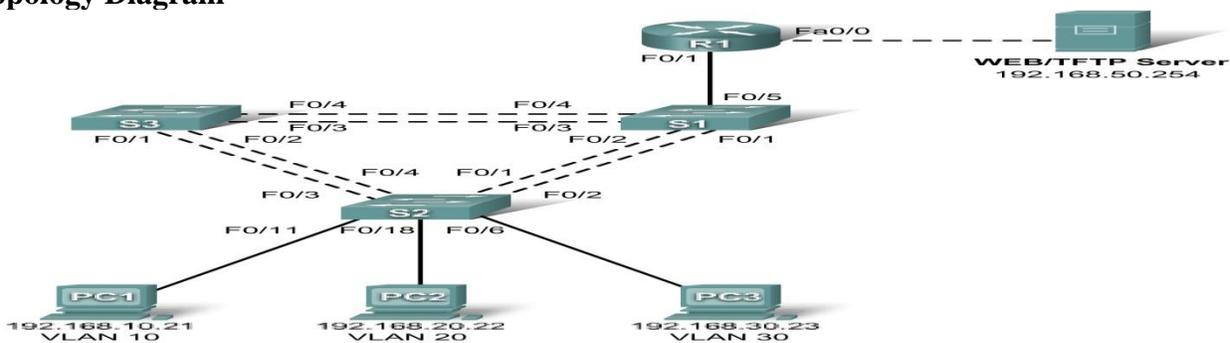
Router Interface	Assignment	IP Address
Fa0/1.1	VLAN1	192.168.1.1
Fa0/1.10	VLAN 10	192.168.10.1
Fa0/1.20	VLAN 20	192.168.20.1
Fa0/1.30	VLAN 30	192.168.30.1
Fa0/1.99	VLAN 99	192.168.99.1

## 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

Device (Hostname)	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

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

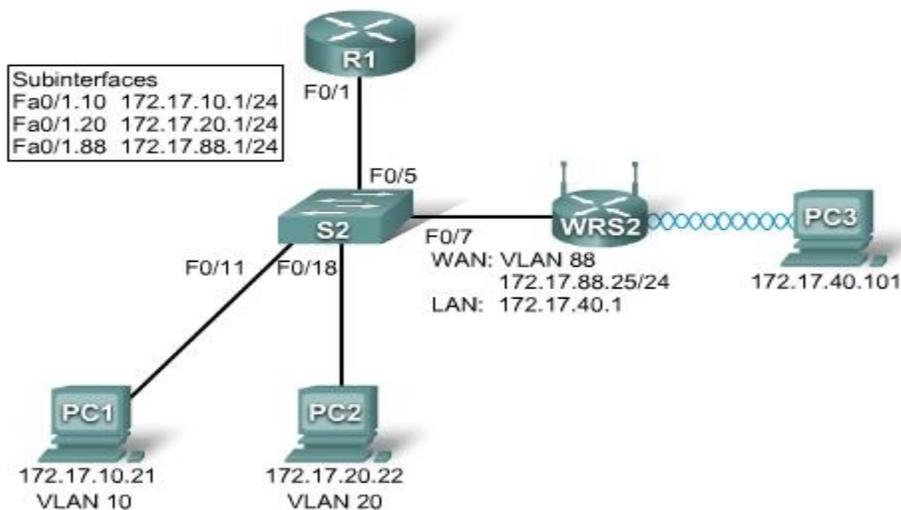
## Scenario

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

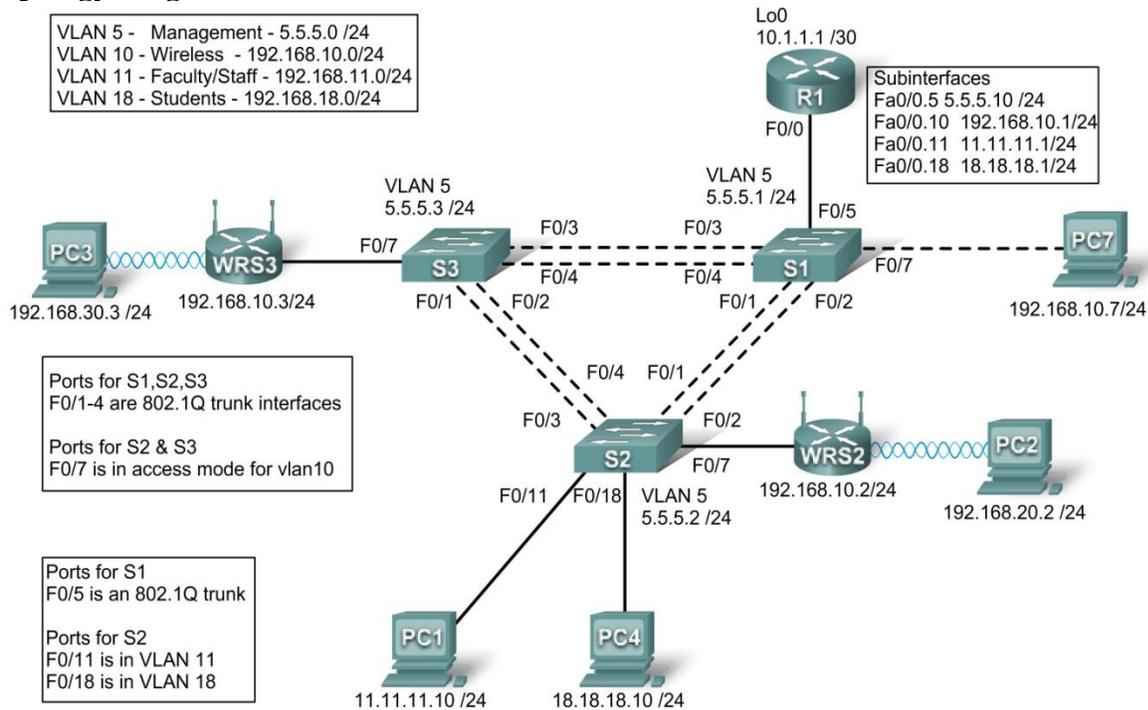


## Learning Objectives

- 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



### Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
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.

## PYTHON LAB

Course Code	L	T	P	Credit
MCA547	-	-	2	1

### Course Objective:

Evaluate python problems, Elicit, analyze and specify python through programming. Design and Plan software solutions to various problems using python paradigms.

### List of experiments

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Simulate elliptical orbits in Pygame
13. Simulate bouncing ball in Pygame

### Text & References:

#### Text:

- Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning, ISBN: 978-1111822705.

#### References:

- The Python Tutorial (<https://docs.python.org/3/tutorial/>): This is the official tutorial from the Python website. No more authoritative source is available.

Code Academy Python Track (<http://www.codecademy.com/tracks/python>): Often cited as a great resource, this site offers an entertaining and engaging approach and in-browser work.

### 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.

## BIG DATA AND ANALYTICS USING R LAB

Course Code	L	T	P	Credit
MCA548	-	-	2	1

### Lab Exercises:

13. (i) Perform setting up and Installing Hadoop in its two operating modes:
  - Pseudo distributed,
  - Fully distributed.(ii) Use web based tools to monitor your Hadoop setup.
  
14. (i) Implement the following file management tasks in Hadoop:
  - Adding files and directories
  - Retrieving files
  - Deleting filesii) Benchmark and stress test an Apache Hadoop cluster
  
15. Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
  - Find the number of occurrence of each word appearing in the input file(s)
  - Performing a MapReduce Job for word search count (look for specific keywords in a file)
  
16. Stop word elimination problem:  
Input: A large textual file containing one sentence per line  
A small file containing a set of stop words (One stop word per line)  
Output: A textual file containing the same sentences of the large input file without the words appearing in the small file.
  
17. Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented. Data available at: <https://github.com/tomwhite/hadoopbook/tree/master/input/ncdc/all> . Find average, max and min temperature for each year in NCDC data set.
  
18. Purchases.txt Dataset
  - Instead of breaking the sales down by store, give us a sales breakdown by product category across all of our stores
    - What is the value of total sales for the following categories?
      - Toys
      - Consumer Electronics
  - Find the monetary value for the highest individual sale for each separate store
    - What are the values for the following stores?
      - Reno

- Toledo
- Chandler

Find the total sales value across all the stores, and the total number of sales.

19. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.
20. Write a Pig Latin scripts for finding TF-IDF value for book dataset (A corpus of eBooks available at: Project Gutenberg)
21. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes.
22. Install, Deploy & configure Apache Spark Cluster. Run apache spark applications using Scala.
23. Data analytics using Apache Spark on Amazon food dataset, find all the pairs of items frequently reviewed together.
  - Write a single Spark application that:
    - Transposes the original Amazon food dataset, obtaining a PairRDD of the type: →
    - Counts the frequencies of all the pairs of products reviewed together;
    - Writes on the output folder all the pairs of products that appear more than once and their frequencies. The pairs of products must be sorted by frequency.

**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

Course Code	L	T	P	Credit
<b>MCA549</b>	-	-	<b>2</b>	<b>1</b>

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 Preference 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 Program to Record Media Using Media Recorder
170. Write a Program to Send and Receive Data From Server

**Examination Scheme:**

<b>IA</b>				<b>EE</b>	
<b>A</b>	<b>PR</b>	<b>LR</b>	<b>V</b>	<b>PR</b>	<b>V</b>
5	10	10	5	35	35

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

## REPORT ON PAPER PRESENTATION IN CONFERENCE

Course Code	L	T	P	Credit
MCA 551	-	-	-	1

**Objective:** Conferences / Seminars / Workshop are good and efficient way to get to know other researchers through their work and also personally. The educational aspect can expose the students to new ways of conducting the business and help them to discover how to be more productive. They provide a great opportunity to network. Collaboration is the way to approach networking.

### Rules and Regulations

- 2<sup>nd</sup> Year / 3<sup>rd</sup> Year Students for which the students and the faculty members can start preparations well in advance prior to the scheduled conference / seminar / workshop.
- The number of students going for any conference / seminar / workshop should be manageable.
- A proposal for the proposed conference / seminar / workshop should be drafted and presented to the HoI reflecting the following key points:
  - Entire activity plan
  - Route Map
  - What are the objectives for the students?
  - What they need to learn, do, and prepare before the conference / seminar / workshop?
  - List of prospective students with Contact Details
  - List of Faculty Coordinators with Contact Details
- After getting approval from the HoI, a note sheet should be prepared and all necessary permission and approval from the competent authorities should be obtained.
- The attention and co-operation of all students and parents are requested to attend the conference / seminar / workshop most effectively. Signing of the letter of Indemnity Bond (Consent-cum-Undertaking) is mandatory for all the parents of students going for conference / seminar / workshop in or outside Jaipur. Duly executed Indemnity Bond should be submitted to HoI Office at least 2 days prior to the visit, without which the accompanying Staff coordinator shall not permit the student to participate in the industrial visit
- The list of students participating in conference / seminar / workshop shall be handed over to the concerned HODs, Staff coordinators.
- Students should be present in formals.
- Students should carry the College Identity Cards during their journey.
- Discipline should be maintained during the conference / seminar / workshop. Any violation will be viewed very seriously.
- A report of the conference / seminar / workshop is to be submitted in 5 days time by students / faculty coordinators once the students are back.

The report to be prepared should reflect the following:-

- What happened at the conference / seminar / workshop the students attend and how does it relate in the best way to the preparations and the learning objectives.
- How do the students will use the outcome of conference / seminar / workshop after it is over?
- What will they gain from it and how can they set up activities that transfer the experience into learning?
- Evaluation parameters for the success of the experience of conference / seminar / workshop.

## **The layout guidelines for the 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

## **ASSESSMENT OF THE PAPER PRESENTATION FILE**

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Report 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.

### **Examination Scheme:**

<b>Components</b>	<b>V</b>	<b>S</b>	<b>R</b>	<b>FP</b>
<b>Weightage (%)</b>	20	20	20	40

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

## COMMUNICATION SKILLS - V

Course Code	L	T	P	Credit
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)**

<b>Course Code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>BSS513</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>

**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:**

<b>Components</b>	<b>SAP</b>	<b>A</b>	<b>Mid Term Test (CT)</b>	<b>VIVA</b>	<b>Journal for Success (JOS)</b>
<b>Weightage (%)</b>	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

# (FOREIGN LANGUAGE)

## FRENCH – V

Course Code	L	T	P	Credit
FLT511	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

Course Code	L	T	P	Credit
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

Course Code	L	T	P	Credit
FLS 511	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

Course Code	L	T	P	Credit
FLC 511	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:**

<b>Components</b>	<b>CT1</b>	<b>CT2</b>	<b>C</b>	<b>I</b>	<b>V</b>	<b>A</b>
<b>Weightage (%)</b>	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

### **Text & References:**

- “Elementary Chinese Reader ” Part-II Lesson 39-46

## PROJECT WORK / INTERNSHIP/ DISSERTATION

Course Code	L	T	P	Credit
MCA660/661/662	-	-	-	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