Kadi Sarva Vishwavidhyalaya

MCA Syllabus

(Effective from August 2014)

(Approved in BOS meeting held in July 2014)

Kadi Sarva Vishwavidhyalaya

Rules & Regulations

Regulations for the Degree of

Master of Computer Applications (M.C.A.)

Kadi Sarva VishwaVidyalaya

BOS: Aug 14, 2014

Definitions:

- Department means department of the university or constituent college of the university.
- Head means Head of the university department or the director of the constituent college of the university.
- He means he or she and his means his or her.
- The course means the 3 years Master of Computer Application – MCA course.

R. PG. MCA 1:

Candidates is eligible for admission in the first semester of the course, if he has passed a Bachelor's degree examination either in science or commerce or management or social science or engineering (including technology) or equivalent, from any recognized university with minimum marks decided as per the directives of the competent authority (Admission committee for admission to this course) from time to time.

A candidate is eligible for admission directly in the 3rd semester of the course under the Lateral Entry scheme, if he has passed BCA / B.Sc. (Computer Science or Information Technology) examination from any recognized university with minimum 50% marks (45% in case of candidates from reserved category). Note that the eligibility criteria are subject to be changed from time to time by the competent authority.

R. PG. MCA 2:

The admission to the course will be given based on the merit of a common admission test conducted by this university or any other competent authority or merit marks of a qualifying examination whichever is applicable.

R. PG. MCA 3:

Examinations for the course will be conducted under the semester system. Therefore each academic year will be divided into two semesters, with a total of 6 semesters for student taking entry at first semester and total of 4 semesters for student taking entry at third semester under lateral entry.

R. PG. MCA 4:

A candidate who has passed a qualifying examination from other university or other examining body and seeking admission to the course in this university shall have to produce the Eligibility Certificate and the Migration Certificate.

R. PG. MCA 5:

A student will be permitted to appear in any semester examination, only if he is certified by the designated authority normally head of the department …

1. That he has attended the course of study to the satisfaction of the designated authority.

2. That he has maintained a good conduct and character during the studies.

R. PG. MCA 6:

Candidates desirous for appearing at any semester examination must forward their applications through the designated authority in the prescribed form, on or before the date prescribed by the university.

R. PG. MCA 7:

For any semester, the maximum marks for the internal and external assessments are shown in the teaching and examination scheme. For the purpose of internal assessment–semester attendance, assignments, class participation, tests etc. methods of assessment will be used by the department.

1. The department will conduct two examinations and the best of them will be considered as the marks of the mid-term examination. The department will also conduct class tests/quizzes or any other evaluation method during the semester and the average marks of these will be considered as marks of the Continuous Evaluation Component (CEC)

2. If a student appears only in one of the two examinations then the marks obtained in the examination in which he appeared will be considered as the mid-term marks. If additional test is to be taken, it can be arranged with the permission of the head of the institution in the time limit.

3. If a student keeps the term and does not appear for any of the two mid-term examinations, he would be allowed to appear in the semester examination but he will have to reappear in the mid-term examination (respective heads) in the next academic session as an ATKT student.

4. If the term of a student is not granted with regard to attendance or internal marks component or by any other reason, the student will have to undergo the study of that semester as and when the next term of the same semester begins.

The department will submit the internal marks; CEC and the mid-term examination marks as per the notification of the University.

R. PG. MCA 8:

A candidate will be promoted to the subsequent semesters according to the following scheme:

1. A candidate would be granted admission to the second semester if his term is granted for semester–1.

2. A candidate would be granted admission to the third semester if his term is granted for both semester-1 and semester–2.

3. A candidate would be granted admission to the fourth semester if his term is granted for semester–2 and semester-3 and passed all the subjects of semester-1. A candidate admitted under lateral entry scheme would be granted admission to the fourth semester if his term is granted for semester–3.

4. A candidate would be granted admission to the fifth semester if his term is granted for semester–3 and semester-4 and passed all the subjects of semester-2 if he has taken admission in the first semester. A candidate admitted under lateral entry scheme would be granted admission to the fifth semester if his term is granted for semester–3 and semester-4.

5. A candidate would be granted admission to the sixth semester if his term is granted for semester–4 and semester-5 and passed all the subjects of semester-3.

6. The degree would be awarded to the student only on successfully completion of all the six semesters for students who took admission in first year and all the 4 semesters for the students who entered into second year through lateral entry.

R. PG. MCA 9:

Following criteria would be followed for awarding the mark statement of any semester in MCA.

1. The mark statement with passing certificate for any semester would be issued only if the student has cleared all the subjects in that semester.

2. The mark statement with canceled certificate for any semester would be issued only if the student fails to clear one or more subjects in that semester.

3. In case a student is unable to clear all the subjects in any semester, he can reappear for the same in the ATKT examinations. The mark statement with passing certificate will be issued only after passing all the subjects in which he was failed. The mark statement will also have the carried forward marks of previously passed subjects.

R. PG. MCA 10:

1. The credits for each subject are as shown in the teaching and examination scheme.

2. To pass a subject in any semester a candidate must obtain a minimum at least 45% marks under each head of the subject and minimum of 45% marks in the aggregate of that subject.

3. If a candidate fails in any heads of a subject, he has to pass only in that particular head in subsequent examination. (That is, for example if candidate fails in midterm exam of a subject, he has to reappear for midterm of that subject.)

4. If a candidate fails in internal components of a subject, his term will not be considered as granted and he has to reappear for that particular subject.

R. PG. MCA 11:

1. Grading Scheme is as follows-

Grading Scheme			Grade Points	Qualitative Meaning of Grade
1	A +	90 – 100	10	Outstanding
2	A	80 – 89	9	Excellent
3	A -	70 – 79	8	Very Good
4	B +	60 – 69	7	Good
5	B	50 – 59	6	Average
6	B -	45 – 49	5	Fair
7	F	<45	0	Fail
8	I	-	-	Incomplete

2. Student will be declared pass if he has secured at least 'B -' grade in all subjects.

3. Student will be considered as fail if he gets 'F' grade in any subject. A student has to clear his 'F' grade, if any, in the subsequent examination.

4. If for any reason, a student do not appear in examination of any subject, he will be awarded 'I' grade i.e. Incomplete.

R.PG.MCA 12:

Following criteria would be followed for awarding the marks statement of any Semester in MCA:

1. The marks statement with passing certificate for any Semester would be issued only if the student has cleared all the subjects in that semester i.e. has obtained "B-" grade or above in all the subjects.
2. The marks statement with cancelled certificate for any Semester would be issued if the student has not cleared one or more subjects in that Semester i.e. has obtained 'F' grade in any subject.
3. In case a student is unable to clear all the subjects in any Semester, he/she would be reappearing for the same in the ATKT examinations. The marks statement with passing certificate will be issued only after the pending subjects in that Semester are cleared i.e. he/she obtains "B-" grade or above in all the pending subjects.
4. As per above scheme, grades will be allocated and SPI (Semester Performance Index) and CPI (Cumulative Performance Index) will be calculated. Students will be awarded the class accordingly

(1) CPI 7.5 or greater - First Class with Distinction

(2) 6.5 => CPI < 7.5 - First Class

(3) 5.5 => CPI < 6.5 - Second Class

(4) 5.0 => CPI < 5.5 - Pass Class

5. **SEMESTER PERFORMANCE INDEX (SPI) -** The performance of a student in a semester is expressed in terms of the Semester Performance Index (SPI).

   The Semester Performance Index (SPI) is the weighted average of course grade points obtained by the student in the courses taken in the semester. The weights assigned to course grade points are the credits carried by the respective courses.

$$SPI = \frac{g1\,c1 + g2\,c2 + \ldots\ldots}{c1 + c2 + \ldots\ldots}$$

   Where g1, g2 …… are the grade points obtained by the student in the semester, for courses carrying credits c1, c2 …… respectively.

6. **CUMULATIVE PERFORMANCE INDEX (CPI) -** The cumulative performance of a student is expressed in terms of the Cumulative Performance Index (CPI). This index is defined as the weightage average of course grade points obtained by the students for all courses taken since his admission to the program, where the weights are defined in the same way as above. If a student repeats a course, only the grade points obtained in the latest attempt are counted towards the Cumulative Performance Index.

7. **For first two semester only SPI will be reflected in the marksheet of students. From third semester onwards, CPI will be computed which will be the base for the award of grade.**

R.PG.MCA 13:

TRANSFER OF CREDITS:-

1. A student in non-credit system of this university will be allowed to migrate to credit system with his/her transfer of credit semester wise and after the transfer he/she will be considered under the rules and regulations of credit system. This transfer will be on case to case basis duly approved by the university authority.

2. A student from other university, recognized by this university, may be granted transfer of credit semester wise. This transfer will be on case to case basis duly approved by the university authority.

R.PG.MCA 14:

MIGRATION FROM OLD SYLLBUS SYSTEM TO NEW SYLLABUS SYSTEM

1. As per the approval of BOS (Board of Studies), the new syllabus will be applicable from the coming academic year or as decided.

2. A student migrating from old syllabus system to new syllabus system will have to satisfy equivalency criteria.

3. As per the approval of BOS (Board of Studies), the new syllabus will be applicable from the coming academic year or as decided.

4. A student migrating from old syllabus system to new syllabus system will have to satisfy equivalency criteria.

5. A migrating student may have to take up new subject(s) as per equivsalency criteria.

R.PG.MCA 15: (Equivalency Criteria)

1. The students associated with previous syllabus and having backlogs may be given 2 trials in addition.
2. Then after, if a student could not pass any subject of backlog, he/she has to study the course as per the syllabus that exists at that point of time.

Kadi Sarva Vishwavidhyalaya

Syllabus Scheme

KADI SARVA VISHWA VIDYALAYA, GANDHINAGAR										
MCA SEMESTER-I SYLLABUS W.E.F. YEAR 2014-15										
Sr. No.	Sub. Code	Name of the subject	SUB Total CREDIT	Teaching scheme (per week)		Examination scheme MID	CEC	External		Total Marks
				Th.	Pr.	Th.	Th.	Th.	Pr.	
1	MCA-101	PROGRAMMING FOR LOGIC BUILDING	5	3	4	25	25	50	50	150
2	MCA-102	INTERNET AND WEB DESIGNING	4	3	2	25	25	50	25	125
3	MCA-103	DATABASE MANAGEMENT SYSTEM	4	3	2	25	25	50	50	150
4	MCA-104	FOUNDATION IN MATHEMATICS	3	3	--	25	25	50	0	100
5	MCA-105	COMPUTER SYSTEM ARCHITECTURE	4	3	2	25	25	50	25	125
6	MCA-106	COMMUNICATION SKILL	3	3	--	25	25	50	0	100
7	MCA-107	*Basic Presentation	1	4*	2	0	50	0	0	50
		TOTAL	**24**	**22**	**12**	**150**	**200**	**300**	**150**	**800**
	Note:	* Presentation Skill Development								

MCA SEMESTER-II SYLLABUS W.E.F. YEAR 2014-15										
Sr. No.	Sub. Code	Name of the subject	SUB Total CREDIT	Teaching scheme (per week)		Examination scheme MID	CEC	External		Total Marks
				Th.	Pr.	Th.	Th.	Th.	Pr.	
1	MCA-201	DATA STRUCTURES	5	3	4	25	25	50	50	150
2	MCA-202	OPERATING SYSTEM	4	3	2	25	25	50	50	150
3	MCA-203	OBJECT ORIENTED CONCEPT AND PROGRAMMING	5	3	4	25	25	50	50	150
4	MCA-204	COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS	3	3	--	25	25	50	0	100
5	MCA-205	SYSTEM ANALYSIS & DESIGN AND SOFTWARE ENGINEERING	3	3	--	25	25	50	0	100
6	MCA-206	FOUNDATION IN NETWORKING	3	3	--	25	25	50	0	100
7	MCA-207	***Seminar:** Computer Peripherals, Networking, Social Networking, Google Search, Search Engine Optimization etc…	1	4*	2	0	50	0	0	50
		TOTAL	**24**	**22**	**12**	**150**	**200**	**300**	**150**	**800**
	Note:	* Seminar Skill Development								

KADI SARVA VISHWA VIDYALAYA, GANDHINAGAR										
MCA SEMESTER-III SYLLABUS W.E.F. YEAR 2014-15										
Sr. No.	**Sub. Code**	**Name of the subject**	**SUB Total CREDIT**	**Teaching scheme (per week)**		**Examination scheme**				
						MID	**CEC**	**External**		**Total Marks**
				Th.	**Pr.**	**Th.**	**Th.**	**Th.**	**Pr.**	
1	MCA-301	OBJECT ORIENTED TECHNOLOGY - I	**5**	3	4	25	25	50	50	150
2	MCA-302	WEB DEVELOPMENT TOOLS - I	**5**	3	4	25	25	50	50	150
3	MCA-303	ADVANCED DATABASE MANAGEMENT SYSTEM	**5**	3	4	25	25	50	50	150
4	MCA-304	ADVANCED NETWORKING	**5**	3	4	25	25	50	50	150
5	MCA-305	OPTIMIZATION TECHNIQUES	**3**	3	--	25	25	50	0	100
6	MCA-306	***MINI PROJECT – 1: Desktop Publishing, Film Making, HTML Website Designing, 3D animation, Small Project with business aspects (Retail, Import Export, HR, etc)**	**1**	1*	2	0	100	0	0	100
		TOTAL	**24**	**16**	**18**	**125**	**225**	**250**	**200**	**800**
	Note:	* Project Counselling								

KADI SARVA VISHWA VIDYALAYA, GANDHINAGAR										
MCA SEMESTER-IV SYLLABUS W.E.F. YEAR 2014-15										
Sr. No.	Sub. Code	Name of the subject	SUB Total CREDIT	**Teaching scheme (per week)**		**Examination scheme**				
						MID	**CEC**	**External**		**Total Marks**
				Th.	Pr.	Th.	Th.	Th.	Pr.	
1	MCA-401	Object Oriented Technology - II	4	3	2	25	25	50	50	150
2	MCA-402	Enterprise Resource Planning	3	3	0	25	25	50	0	100
3	MCA-403	Software Project Management	3	3	0	25	25	50	0	100
4 - 1	MCA - 404 (A)	A) Mobile Programming with Android	5	3	4	25	25	50	50	150
	MCA - 405 (A)	B) Open Source Technology in Web Development (LAMP)	5	3	4	25	25	50	50	150
	MCA - 406 (A)	C) Mobile Cross Platform Development Using PhoneGap	3	3	0	25	25	50	0	100
4 - 2	MCA - 404 (B)	A) Database Administration	5	3	4	25	25	50	50	150
	MCA - 405 (B)	B) Big Data & Data Analytics	5	3	4	25	25	50	50	150
	MCA - 406 (B)	C) Distributed Database	3	3	0	25	25	50	0	100
4 - 3	MCA - 404 (C)	A) Wireless Sensor's Networks	5	3	4	25	25	50	50	150
	MCA - 405 (C)	B) Network Security	5	3	4	25	25	50	50	150
	MCA - 406 (C)	C) Heterogeneous Network	3	3	0	25	25	50	0	100
5	MCA-407	Mini Project - II	1	0	2	0	50	0	0	50
		TOTAL	24	18	12	150	200	300	150	800

KADI SARVA VISHWA VIDYALAYA, GANDHINAGAR										
MCA SEMESTER-V SYLLABUS W.E.F. YEAR 2014-15										
Sr. No.	Sub. Code	Name of the subject	SUB Total CREDIT	Teaching scheme (per week)		Examination scheme MID	CEC	External		Total Marks
				Th.	Pr.	Th.	Th.	Th.	Pr.	
1	MCA-501	Data Warehousing & Data Mining	5	3	4	25	25	50	50	150
2	MCA-502	Cyber Security & Forensic Science	5	3	4	25	25	50	50	150
3	MCA-503	Cloud Infrastructure & Services	5	3	2*	25	25	50	0	100
4	MCA-504 A	A) Object Oriented Technology - III	5	3	4	25	25	50	50	150
	MCA-504 B	B) Web Development Tools - II	5	3	4	25	25	50	50	150
	MCA-504 C	C) Programming using Open Source	5	3	4	25	25	50	50	150
	MCA-504 D	D) Next Generation Application Developmnet	5	3	4	25	25	50	50	150
5	MCA-505	Industrial Project - I	4	0	8	0	50#	0	200	200
		TOTAL	24	12	22	100	150	200	350	750

* Tutorial Based Practical # Internal Project Evaluation

KADI SARVA VISHWA VIDYALAYA, GANDHINAGAR										
MCA SEMESTER-V SYLLABUS W.E.F. YEAR 2014-15										
Sr. No.	Sub. Code	Name of the subject	SUB Total CREDIT	Teaching scheme (per week)		MID	CEC	External		Total Marks
				Th.	Pr.	Th.	Th.	Th.	Pr.	
1	MCA-601	Industrial Project - II	24	16 Week (48 Hrs at Industry Side per week)		0	300	0	500	800

Kadi Sarva Vishwavidhyalaya

Syllabus

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – I)

Subject Name: Programming for Logic Building – MCA101

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Description:
This course introduces computer programming and problem solving in a structured program logic environment. It introduces the basic flow and construction of algorithm for given problem. Course includes language syntax, data types, program organization, problem-solving methods, algorithm design, and logic control structures.

Objectives:
1. Upon successful completion of this course, the students will be able to create flowcharts and pseudocodes to illustrate program algorithm or process and apply top-down concepts in algorithm design.
2. Student will able to: Describe the major components in problem solving for a computer program, concept of data storage and named memory locations, Apply decision and repetition structures in program design, Write and incorporate methods and functions to demonstrate program competence.
3. Students will also be able to implement input and output to access and process files.

Prerequisites: None

Course Contents:

UNIT – I: Introduction to Programming and Basics of C [20%]
Introduction to programs, Types of Programming Languages, Introduction to compiler, interpreter, loader and linker, Algorithms : different ways of stating algorithms, An overview of C – variables, Data types, Token, Operators and Expressions, Type conversion, formatted and non-formatted Input/Output

UNIT – II: Control statements, Arrays and strings [20%]
Selection statements, Conditional operator, Switch statement, Looping statements: while, for and do-while, goto statement, Special control statements: break and continue, Nested loops, Arrays-One Dimensional Array, Strings: String Handling Functions, Multidimensional arrays, Arrays of strings

UNIT – III: User-Defined Functions and User Defined Data types [20%]
Concept of Function, Using Functions: Function prototype, Function Definition and Function Calling, Passing arrays to functions, Storage classes, Recursion, Structures: Declaring Structures, Initialization, Copying and Comparing Structures, Arrays of Structure, Arrays within Structures, Nesting of Structures, Structures and functions, Union , Enumeration Types, Bit fields

UNIT – IV: Pointers **[20%]**

Pointers-Fundamentals, Arrays and Pointers, Pointers and Strings, Pointer Arithmetic, Pointers to Pointers, Array of Pointers, Pointers to Functions, Pointer and Structures ,Dynamic memory allocation

UNIT – V: File Management in C and Preprocessor **[20%]**

Introduction to File, Defining and Opening File, Closing a File, Working with Text and Binary Files, Direct File Input and Output, Random Access to Files, Bitwise operators, Command Line Arguments, C Preprocessor

Text Book(s):

1. Programming in C By Pradip Dey, Manas Ghosh, Second Edition, Oxford Publication

Other Reference Books:

a. Programming in Ansi C by E Balagurusamy, TMH
b. Let Us C by Yashavant Kanetkar, BPB Publication.
c. The C Programming Language ANSI C Version by Brian W. Kerninghan & Dennis M. Ritchie
d. Programming with C by Byron Gottfried, Schaums Outline,Tata McGraw Hill

Practical List:

- Draw Flow Charts for following problem statements :
  - (i) Draw a flowchart which will accept two numbers from user and will display values of variables after swapping them with each other.
  - (ii) Draw a flowchart to find out simple interest and compound interest.
  - (iii) Draw a flowchart to read a 3-digit integer and print its reverse number.
  - (iv) Draw a flowchart to read a number in seconds and display that in the form Hour: Min: Seconds.
  - (v) A cashier has currency notes of denominations 10, 50 and 100. Draw a flowchart to read the amount in hundreds and find the total no. of currency notes of each denomination the cashier will have to give to customer.
- Write a Program to rotate the values of x, y and z such that x has the value of y, y has the value of z and z has the value of x.
- Write a Program that reads a floating-point number and then displays the right-most digit of the integral part of the number.
- Write a Program to check whether the entered number is odd or even.
  - (i) without using else option
  - (ii) with using else option.
- Write a Program to read three values using scanf and print the following results:
  - (i) Sum of the values
  - (ii) Average of the three values
  - (iii) Largest of the three values
- Write a program to read three values from the user and print the smallest value without using if statement. (Hint: Use conditional operator)
- Write a program to convert a decimal number into any base.
- Write a program to print Pascal triangle.
- A company insures its drivers in the following cases:
  - (i) If the driver is married.
  - (ii) If the driver is unmarried, male and above 30 years of age.
  - (iii) If the driver is unmarried, female and above 25 years of age.

  Write a Program which takes age, sex and marital status and check whether that person will be insured or not. (Use logical operators)

- Write a program to find the number of and sum of all integers greater than 100 and less than 200 that are divisible by 7.
- Write program to accept 4-digit number from keyboard, and display it on screen in words. (i.e. 4238 => Four Two Three Eight) (Use switch statement)
- Write a program to find the sum of all elements of one-dimensional array.
- Write a program for multiplication of two matrices.
- The annual examination results of 10 students are tabulated as follows:
  Roll No. Subject1 Subject2 Subject3
  Write a program to read the data and determine the following:
  a. Total marks obtained by each student
  b. The highest marks in each subject and the roll no. of the student who secured it
  c. The student who obtained the highest total marks.
- Write a program to extract a portion of a character string and print the extracted string. Assume that m characters are extracted, starting with the nth character.
- Write a program to replace a particular word by another word in a given string.
- Write a function palindrome that returns 1 if its argument is palindrome and returns 0 otherwise.
- Write a function to sort the elements of an array in descending order.
- Write a program to develop your own functions for performing following operations on strings:
  (i) To copy one string to another
  (ii) To concatenate two strings
  (iii) To compare two strings
- Write a program that defines a structure that can describe a student. It should have members that include student id, name, mark1, mark2, total, percentage. Ask 10 students details from user and calculate total marks, percentage for each subject. Write a function that will display the detail of all students in descending order of their percentage in following format.
  ID Name Mark1 Mark2 Mark3 Total Percentage

- Define a structure that can describe a hotel. It should have members that include the name, address, grade, average room charge, and number or rooms. Write functions to perform the following operations:
  (i) To print out hotels of a given grade in order of charges.
  (ii) To print out hotels with room charges less than a given value.
- Write a program using pointer to read an array of integers and print its elements in reverse order.
- Write a function (using a pointer parameter) that finds the average of all the elements of a given array.
- Using pointers, write a function that receives a character string and a character as argument and deletes all occurrences of this character in the string. The function should return the corrected string with no holes.
- Write a program to copy contents of one file to another. Use command line argument to specify file names.
- Write a program that opens an existing text file and copies it to a new text file with all lowercase letters changed to capital letters and all other characters unchanged.
- Write a program to read integers from one file. Make two files named ODD and EVEN. ODD file will contain all odd integers from first file and EVEN file will contain all even integers from first file.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – I)

Subject Name: Internet and Web Designing – MCA102

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
4	3	2	25	25	50	25	125

Course Description: HT ML is the markup language that every web developer uses in order to structure and present content in the Internet. HTML5 is the standard that is being shaped and developed currently. It extends and improves the last HTML4 standard and takes it to the next level with support multimedia, communication and more. This course provides the knowledge and skills for developing web applications with HTML5. Students are required to have the following skills: Ability to construct a Web application.

Objectives:

1. Students will learn about the opportunities, challenges and techniques for developing websites built with the new resources provided by HTML5.
2. Students will learn about the evolving principles and standards for constructing accessible websites; will understand different classes of disabilities and the available techniques for rendering websites useful to those with disabilities.

Prerequisites: Working knowledge of Internet and HTML

Course Contents:

UNIT – I: Internet and WWW [20%]

Internet Basics: Concept of Internet, evolution, Internet Applications: Email: Understand mail Addresses, Telnet: Understand Telnet Concept, Telnet Commands, FTP: What is FTP, How to use FTP, World Wide Web: Understanding how the web works? , Web page: static, Dynamic, Opening Webpage, Viewing two web pages at the same time, URL, HTTP, Web browser.

UNIT – II: Starting with HTML [20%]

Introduction to HTML, Basic block of HTML, Setting up the Document Structure, Formatting Text by using Tags, Using Lists and Backgrounds, Creating Hyperlinks and Anchors

UNIT – III: Style Sheets and Graphics [20%]

Introduction to Style Sheets, Formatting Text by Using Style Sheets, Formatting Paragraphs by Using Style Sheets, Displaying Graphics

UNIT – IV: Page Layout and Navigation **[20%]**

Creating Navigational Aids, Creating Division- Based Layouts, Creating and Formatting Tables, Creating User Forms, Including Java Script and External Content

UNIT – V: Going Live: **[20%]**

Publishing Pages, HTML for Email

Text Book(s):

1. Honey Cutt, "Using the Internet", 4th Edition, PHI Learning.
2. Faithe Wempen, "Step by Step HTML 5", South Asian Edition, Microsoft Press and PHI Learning
3. Wendy Willard, "HTML: A Beginner's Guide 5/E", 5th Edition, McGraw Hill

Other Reference Books:

1. Teach yourself the Internet in 24 Hrs, SAMS
2. HTML Black Book by Steven Holzner, Publisher: Dreamtech Press
3. HTML Complete Reference by Thomas A. Powell, Publisher Tata McGraw Hill
4. Teach yourself Java Script in 24 by Michael Moncur Publisher: Pearson Education

List of Programs in Internet Technologies:

1. Create a web page with appropriate content and insert an image towards the left hand side of the page when user clicks on the image, it should open another web page
2. Create a web page showing an ordered list of names of the subjects, with nested list if any subject has been selected it should display the content of each subject
3. Write HTML code to display your bio-data using different types of lists and tables
4. Write the HTML to make it possible for someone clicking the words "About the authors" at the top of the page to skip down to a list of credits at bottom of the page
5. Suppose your company has three employees and you want to create a company "directory page" listing some information about each of them. Write the HTML for that page and link one employee to another employee
6. Write a HTML to create a "guestbook" from that asks someone for his/her name, sex, age, email address
7. Write html to list the names in a frame taking up the left 25% of browser window. If clicking each name brings up a corresponding web page in right 75% of web browser window
8. Develop an Html application which accepts registration from the user and it should display the details of the products available in the Warehouse
   (a) Item Number
   (b) Item Name
   (c) Total Quantity available
   (d) Price/unit
   - Use Form tag to display the registration form
   - Use Table tag to represent data
   - Cellspacing and cellpading attributes should be used in table
9. Develop a Html application which displays the dishes available in a particular restaurant and also mention the rates for each dishes. Give a name for your restaurant which is common for all the web pages

The details of the dishes are given below

- Category of dishes
  - o Chinese
  - o Indian
- Sub Category
  - o Starter
  - o Main Items
  - o Desserts

- Use frames to display item available in restaurant and any other extra facilities given in restaurant
- Use list tag to display sub categories

10. Develop an Html application which displays the information of all trains:
    a. Based on the day (Monday, Tuesday etc) selected
    b. Train Number
    c. Train Name
    d. Departure
    e. Arrival
    f. Departure Time
    g. Arrival Time
    - Use form to display the details
    - Also display approximate railway chart for a particular zone by using tables.
11. Create a web page with appropriate content and insert an image towards the left hand side of the page when user clicks on the image, it should open another web page with enlarged image
12. Develop a Html application for Library Management which displays the following details
    - Different areas in the library
    - Books available in different areas
    - Total number of books available in the library
    - Journals available
      - o National
      - o International

    Use frames to display the contents
13. Write Html code which gives information of different cities in Gujarat, when user click on any of the cities form left frame, the information about respective cities should appear on right frame
    a. Use frame tag Split web page with frames taking the left 25% of browser window, If clicking each name corresponding web page in right 75% of web browser window
    b. Also display the tourist spot of Gujarat state
14. Employ Cascading Style Sheet in HTML tags.
15. Use Inline Cascading Style sheet and Embedded style sheet
16. Write a program in Java Script which allows certain fields like Name, Age, Gender, Age, Cite, State and Country. Perform certain validations like name should accept only alphabets, Gender should accept only 1 character, Age should be only in numeric between 1 and 100.
17. Write a program in Java Script which allows certain fields like First Name, Last name, email address, comments. Perform certain validations like first name and last name should not be empty and email should be valid. If user clicks the submit button it should open a new window and contents should be displayed. If reset, contents should be cleared.

18. Write a program in Java Script which contains 3 functions which are invoked on clicking the Red, Blue and green buttons. The function should contain changing the background, foreground to respective color and to display corresponding status messages.
19. Develop a webpage using java Script which has following fields like Source, Destination; train no, Date and Number of tickets.
    a. Source and destination should allow only place code in 3 character
    b. Date should be in the format DD/ MM / YY
    c. Number of tickets should allow only numeric
20. Write a program in Java Script that allows user to enter the text. It also allows the user to accept size and font name that has to be applied on the text entered by the user.
21. Write a program in Java Script which accepts names in a text box, if a button is clicked names should be sorted and added in another one text area.
22. Write Java Script code to represent Document object
23. Represent all properties and methods of Location object in Java Script

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – I)

Subject Name: Database Management System – MCA103

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
4	3	2	25	25	50	50	150

Rationale (Course Objective):

The objective of this course is to provide a strong foundation in database concepts, design and application to the students to groom them with database management skills, like database designer and database management. The subject will emphasis on basic concepts, how to organize, create, maintain and retrieve information from a DBMS and managing DBMS.

Learning Outcome:

Students will learn five components like basic concepts of DBMS, data modeling, database design, implementation and maintenance at the end of this course, which is as under:

- In basic concept they will learn database application needs, database system architecture, types of data, types of database systems etc.
- In data modeling they will learn to develop data model for database system using ER diagrams.
- In database design they will learn functional dependencies, normalization techniques.
- In implementation and maintenance they will learn to populate and query a database using SQL commands like DDL, DML, TCL, and DCL.

Prerequisite:

Knowledge about data and information and its need in information system like business, education, banking etc.

Unit 1 Basic Concepts and Architecture [20%]

a. Basic concepts and definitions: Data, Information, Data versus Information, Data warehouse, Metadata, System Catalog, Data items, Records, Files
b. Data Dictionary: Components of Data dictionary, Active and Passive data dictionary
c. Database, Database system, Functions and Responsibilities Database administrator
d. File oriented system versus database system: Advantages and disadvantages of File system, Advantages and disadvantages of Database system, Comparison of File system and Database system
e. Database system architecture: Schemas and Instances, Three level database architecture, Data independence, Mappings, Functions of DBMS, Data models

Unit 2 Data Modeling using Entity Relationship Model [20%]

a. The Entity-Relationship Model: Entity sets, Relationship sets, Attributes
b. Constraints: Mapping cardinalities, Keys, Participation constraints
c. Entity-Relationship Diagrams: Symbols and their meaning in E-R diagram
d. Entity-Relationship Design Issues: Use of Entity sets versus Attributes, Use of Entity sets versus Relationship sets, Binary versus n-ary Relationship sets, Placement of Relationship attributes
e. Strong and Weak Entity sets
f. Extended E-R diagram Features: Specialization, Generalization, Attribute Inheritance, Constraints on Generalization, Aggregation
g. Reduction to Relational Schemas: Representation of Strong entity sets, Representation of Weak entity sets, Representation of Relationship sets, Redundancy of Schemas, Combination of Schemas, Representation of Composite and Multivalued attributes, Representation of Generalization, Representation of Aggregation

Unit 3 Relational Database and Database Design: [20%]

(i) Functional Dependency: Functional dependency diagram and examples, Full functional dependency, Armstrong's axioms for Functional dependencies, Redundant Functional dependencies
(ii) Decomposition: Lossy Decomposition, Lossless-Join decomposition, Dependency-Preserving decomposition
(iii) Normalization and Normal Forms: Need for normalization, 1NF, 2NF, 3NF, BCNF, Properties of Multi-valued dependencies, 4NF, Join dependency, 5NF

Unit 4 Database implementation using SQL [20%]

a. Basic datatypes in SQL
b. Creating and Managing Tables: CREATE TABLE and ALTER TABLE commands, INSERT, UPDATE and DELETE commands, Viewing data in the Tables, eliminating duplicate rows when using a select statement, Sorting data in a table, Creating a table from a table, Inserting data into a table from another table.
c. Creating and Dropping Integrity Constraints: Primary key, Foreign key, Unique key, Not Null, Check
d. Computations done on table data: Arithmetic operators, Logical operators, Range searching, Pattern matching
e. Database Functions: Scalar and Group functions (Aggregate functions, Numeric functions, String functions), Conversion functions(To_CHAR(), TO_DATE())
f. Grouping and Joining data from tables in SQL: GROUP BY Clause and HAVING Clause, Joins (Inner Join, Outer Join, Cross Join, Self Join)

Unit 5 Database transaction processing, Concurrency control and Recovery [20%]

a. Transaction Concept :Transaction execution and problems, Transaction properties(ACID Property), Transaction log
b. Concurrency Control: Problems of concurrency control, Permutable actions, Schedule, Serialisable schedules, Locking methods for concurrency control(Lock granularity, Types of locks and Two-phase

locking), Deadlocks, Timestamp method for concurrency control and Optimistic method for concurrency control

c. Database Recovery: Database recovery concepts, Types of database failures, Types of database recovery (Redo and Undo), Recovery techniques: Deferred update and Immediate update, Shadow paging, Checkpoints.

Text Book(s):

1. "Database Systems : Concepts, Design and Applications", S K Singh,Pearson Education
2. "Database System Concepts", 5th Edition, Silberschatz, Korth, Sudarshan, McGraw HillPublication
3. "SQL,PL/SQL The programming language of oracle", 3rd revised edition, Ivan Bayross, BPB Publication

Other Reference Books:

1. "An Introduction to Database Systems", 8th Edition, C J Date, A Kannan, S Swaminathan,, Pearson Education (2006)
2. "Database Systems : Design, Implementation and Management", 7th Edition, Peter Rob, Carlos Coronel, Cengage Learning (2007)
3. "Fundamentals of Database Systems", 5th Edition, Elmsari, Navathe,Pearson Education (2008)

List of Practicals

Consider the following tables -

Client_Master (Client_no, Name, Address, City, Pincode, State, Balance_due)

Product_Master (Product_No, Description, Profit_Percent, Unit_Measure, Qty_On_Hand, Reorder_Level, Sell_Price, Cost_Price)

Salesman_Master (Salesman_No, Salesman_Name, Address, City, Pincode, State, Sales_Amount,

Target_To_Get, Yearly_targeted_Sales, Remarks)

Sales_Order (Order_No, Order_Date, Client_No, Delivery_Address, Salesman_No, Delivery_type,

Billed_Yes_Or_No, Delivery_Date, Order_Status)

Sales_Order_Details (Order_No, Product_No, Qty_Ordered, Qty_Dispatched, Product_Rate)

Exercise-1

1. Create all the tables using proper constraints
2. Apply table level constraint to make sure that qty_on_hand must not be less than or equal to reorder_level in PRODUCT_MASTER table. (use Check Constraint).
3. Insert minimum 10 values in each tables.

Exercise-2

1. Display all clients' information.
2. Display all Clients who stay in 'Delhi'.
3. Display client name and city.
4. Find the names of all clients having 'a' as the second letter in their names.
5. Find out the clients who stay in a city whose third letter is 'a'.
6. Find the list of all clients who stay in 'Bombay' or 'Delhi'.
7. Print the list of clients who's Balance_Due is greater than value 10000.
8. Print the information from Sales_Order table for orders placed in the month of January.
9. Display the order information for Client_No 'C00001' and 'C00002'.
10. Find products whose selling price is greater than 2000 and less than or equal to 5000.
11. Find products whose selling price are more than 1500. Calculate a new selling price as, original selling price * 0.15. Rename the new column in the above query as new_price.
12. List the names, city and state of clients who are not in the state of 'Maharashtra'.
13. Find all the products that's Qty_On_Hand is less than Reorder_Level.
14. Display city from client_master such way that no city should display repeatedly.
15. Display all the details from sales_order table in a descending order of order date.
16. Delete all the details from Client_master.
17. Delete all the details from clients who stay in 'Delhi'.
18. Delete all the records of sales order in which order status in 'C' (i.e Complete).
19. Give 5% raise to sell price of all the products which has profit percent less than 50.
20. Deduct 100 Rs from the balance due for the client no 'C00002'.
21. Add Column 'Mobileno' number(10) in Client_Master Table.
22. Add column 'rank' number (2) in Client_Master table and set its default value to '0'. (use default Clause)
23. Change the size of column 'Mobileno' in Client_Master from 10 to 13.
24. Make 'Mobileno' column in Client_Master as Not Null.
25. Add constraint to 'Rank' column so that value of rank can be in range 0 to 5 only.
26. Remove the constraint created above.
27. Make 'Mobileno' column in Client_Master as it can store unique mobile number of clients.
28. Create a table 'Client_info' from client_master to store all clients info who stays in Mumbai
29. Rename table Client_info to Client_in_Mumbai.
30. Destroy table Client_in_Mumbai.
31. Count total no of clients who are not in the state of 'Maharashtra'.
32. Count the total number of orders.
33. Calculate the average price of all the products.
34. Determine the maximum and minimum product prices. Rename the output as max_price and min_price respectively.
35. Count the number of products having price greater than or equal to 1500.
36. Find all the total no of products that's Qty_On_Hand is less than Reorder_Level.
37. Display first five characters of clients name.
38. Display the order number and day on which clients placed their order.
39. Display the month (in alphabets) and date when the order must be delivered.
40. Display the Order_Date in the format 'DD-Month-YY'. E.g. 18-February-03.
41. Find the date, 15 days after today's date.
42. Find the number of days elapsed between today's date and the delivery date of the order placed by the clients.
43. Display the products no, description, 5% raise in sells price for which the product cost price is less than 100 and profit percentage is less than 2%.
44. Print the Description and Total Qty sold for each product.

45. Find the value of each product sold.
46. Calculate the average qty sold for each client that has a maximum order value of 15000.00.
47. Find out the sum of all the bills ordered for the month of January.
48. Display details of orders for which only two days falls between order date and delivery date.
49. Display month wise total price for each product which are sold in year 2009.
50. Display all the client's name is upper case, whose name is having more than 5 characters.

Joins and Correlation:

51. Find out the products, which have been sold to 'Ivan Bayross'.
52. Find out the products and their quantities that will have to be delivered in the current month.
53. Find the Product_No and Description of a product having highest sell.
54. List the Product_No and Order_No of customers having Qty_Ordered less than 5 from the Sales_Order_Details table for the product '1.44 Floppies'.
56. Find the products and their quantities for the orders placed by 'Ivan Bayross' and 'Vandana Saitwal'.
57. Find the products and their quantities for the orders placed by Client_No 'C00001' and 'C00002'.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – I)

Subject Name: Foundation in Mathematics – MCA104

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	-	25	25	50	-	100

Course Description:

The purpose of this course is to introduce the mathematical elements of computer science including propositional logic, predicate logic, sets, functions and relations, combinatorics, matrices, graphs, trees, and Boolean logic. In this course, emphasis is on providing a concept for the application of the mathematics in computer science.

Objectives:

1. To introduce a number of Discrete Mathematical Structures (DMS) found to be serving as tools even today in the development of theoretical computer science.
2. To present the foundations of many basic computer related concepts and provide a coherent development to the students for the courses like Fundamentals of Computer Organization, RDBMS, Data Structures, Analysis of Algorithms, Cryptography, Artificial Intelligence and others.
3. To develop mathematical reasoning and analytical thinking that is the base of computer science.

Prerequisites: Knowledge of basic concepts on Sets, Different operations on sets, Number systems, Functions.

Course Contents:* The proofs of the theorems must be excluded and only statements and their applications should be discussed.

UNIT – I Mathematical Logic: [20%]

Statements, Connectives, Negation, Conjunction, Disjunction, Conditional, Biconditional, Well-formed-formula, Tautology, Contradiction, Logical equivalence, Introduction to Predicate Calculus, Quantifiers, Free and Bound Variables, Domain of discourse, Argument, Validity of argument

UNIT – II Permutations and Combinations: [20%]

Basic principles of counting: the multiplication principle, the addition principle, Factorial notation, Binomial theorem, Pascal's triangle, Permutations, Permutations with repetitions, Circular permutations, Combinations of n different objects, Combinations with repetitions.

UNIT – III Relations and Lattices: [20%]

Relations, Properties of relation: Reflexive, Symmetric, Transitive, Irreflexive, Antisymmetric, Representation of relation, Equivalence relation, Lattices as poset, Properties of lattices, Lattices as algebraic systems, Sub-lattices, Complete lattices, Bounds of lattices, Distributive lattice, complemented lattices

UNIT – IV Algebraic Structures & Graph theory: [20%]

Algebraic Structures: Definitions and examples of Semigroups, Monoids and Groups, Abelian group, Permutation groups, Cyclic groups, Subgroups

Introduction to Graph theory, Definition of digraph, Undirected graph, Indegree, Outdegree, Subgraph ,Converse of a graph, Isomorphism, Paths, Reachability and Connectedness, Matrix representation of graph, Trees

UNIT – V Boolean Algebra and Applications of Boolean Algebra: [20%]

Introduction, Definition and Important properties of Boolean Algebra, Sub Boolean algebra, Join-irreducible, Meet-irreducible atoms, Anti atoms, Stone's representation theorem (Without Proof), Boolean expressions and their equivalence, Minterms and Maxterms, Free Boolean algebra, Values of Boolean expression, canonical forms, Boolean functions, Representation of Boolean function, Minimization of Boolean Expressions by Karnaugh maps.

Text Book(s):

1. "Discrete Mathematical Structures with Applications to Computer Science", J.P. Tremblay and R.Manohar, Tata McGraw-Hill
2. "Discrete Mathematical Structure", D. S. Malik, M. K. Sen, Cengage Learning
3. "Discrete Mathematics" Semyour Lipschutz and Mark Lipson , Tata McGraw-Hill

Other Reference Books:

1. Discrete Mathematics and its applications, Tata McGraw-Hill, 6th edition, K. H.Rosen.
2. Discrete Mathematical Structure, Pearson Education, Bernard Kolmann& others,Sixth Edition
3. Discrete Mathematics with Graph Theory, PHI, Edgar G. Goodaire, Michael M.Parmenter.
4. Logic and Discrete Mathematics, Pearson Education, J. P. Tremblay and W. K.Grassman.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – I)

Subject Name: Computer System Architecture – MCA105

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
4	3	2	25	25	50	25	125

Course Description:

This course covers the design and architecture of computer and digital systems. It explains how bit information is processed in logical gates and how register array called memory is composed of these gates. It also avails knowledge of the internal structure and operation of a digital computer at the level of memory, registers, Processor and flow of control.

Objectives:

1. For students this course unveils the mystery behind the black box called computer. This is their first opportunity to see the control aspects of the machine and thus fully appreciate the entire system.
2. Students will able to explain different data representation (e.g., different number systems, 2's complement arithmetic, etc.) and design combinational/sequential circuits using different gates and flip-flops.

Prerequisites: None

Course Contents:

UNIT – I: Number System and Codes **[20%]**

Introduction, Radix Notation: Decimal, Binary, Octal and Hexadecimal, Conversion of Numbers from one radix form to another, Signed Binary Number, Floating Point Representation of Number, Binary Arithmetic: Addition, Subtraction, Multiplication and Division, Complement Binary Arithmetic: 1's Complement Arithmetic and 2's Complement Arithmetic, Arithmetic Overflow, Codes: BCD Code, 2-4-2-1 code, Excess 3 code, Gray code, Error Detecting Code: Parity codes, Error Correcting Code: Hamming Code

UNIT – II: Boolean Algebra and Logic Gates **[20%]**

Introduction, Boolean Algebra, Overview of Logic Circuit, De-Morgan's Theorems, Standard Representation for Logical Functions, Minterm and Maxterm, Simplification of Boolean Expressions: Algebraic simplification and Karnaugh Map: Simplification of Sum of Products and Simplification of Product of Sums, Don't Care condition

UNIT – III: Combinational Logic Circuits [20%]

Construction of the ALU, Binary Half-Adder, Full-Adder, Parallel Binary Adder, Binary-Coded-Decimal Adder, Binary Multiplication and Binary Division, Multiplexer, Demultiplexer

UNIT – IV: Sequential Logic Circuits [20%]

Flip-Flops, Transfer Circuits, Clocks, Flip-flop Designs, Gated Flip-flop, Master-Slave Flip-flop, Shift Register, Binary Counter: Ripple counter, gated-clocked binary counter and binary up-down counter, BCD Counter, Counter Design: Using RS Flip-flop and Using JK Flip-flop, Flip Flop Excitation Tables

UNIT – V: Semiconductor Memory Devices and Processor [20%]

Introduction, Memory Organization, Functional Diagram of Memory, Memory Operations, Characteristics of Memory Devices, Read and Write Memory, Read Only Memory, Central Processing Unit: CPU Organization, Instruction, Addressing Modes, Interrupts and Exceptions, Instruction Cycle, Instruction and Data Flow

Text Book(s):

1. Digital Electronics By G.K. Kharate, Oxford University Press
2. Digital Computer Fundamentals By Thomas C. Bartee, Sixth Edition Tata McGraw Hill
3. Computer Fundamentals: Architecture & Organization 4th Edition, B.Ram, New Age International Publishers

Other Reference Books:

1. Computer System Architecture By – Morris Mano,3rd Edition Prentice Hall of India
2. Computer Architecture and Organization By - B. Govindrajalu
3. Fundamentals of Digital Circuits By A. Anand Kumar, PHI publications
4. Computer Organization and Architecture By William Stallings, 6^{th} edition, PHI

Practical List: (Practicals on LOGISIM simulation open source software environment)

1. Develop circuits of all the Gates.
2. Develop circuits of adder, subtractor, multiplier and divider.
3. Develop circuits of plexers – multiplexer, demultiplexer, & decoder.
4. Develop circuits of flip flops – RS Flip flop, JK Flip Flop & D Flip Flop.
5. Develop circuits of Shif register and Counter.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – I)

Subject Name: Communication Skill – MCA106

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	-	25	25	50	-	100

Course Description: Technical Communication is most essential for students and professionals. Thus there is a drastic need for effective communication. Due to the various phenomenal changes in the business environment, recruiters are now looking for students with good computer knowledge as well as good communication skills. Thus, the objective of this course is to equip the students with the basics of communication skills and technical writing, so that they can put it into use in their day-to-day activities.

Objectives:

1. To hone basic Communication Skills (LSRW) of the students by exposing them to the key
2. communication techniques, and thereby
3. To increase the student's understanding of his or her own communication behavior.
4. To increase the student's understanding of others communication behaviors.
5. To sharpen Communication Skills of the students with reference to Organizational Structure,
6. To expose them to the modern modes of communication,
7. To improve the student's communication skills in both social and professional contexts.
8. To improve the student's ability to demonstrate effective conflict resolution skills.

Learning Outcomes:

1. At the end of the Course, a student will be able to express himself and to participate in the classroom discussions and other such academic or academic support activities.
2. The student will also be able to comprehend whatever he/she receives from Informal Interactions with the family, teachers and friends; and from Formal Communications taking Place in Lectures, Laboratories and the like.
3. In general, the students will develop the ability to communicate effectively using suitable styles and techniques.

Prerequisites: Working Basic Knowledge of English Language

Course Contents:

UNIT – I: Principles of Communication **[20%]**

Nature and Scope of Communication: Introduction and Importance of Communication, Basic of Communication, Function of Communication, Communication Basics, Communication Network, Communication Barriers

Non-verbal Communication: Significance of Non V-verbal Communication, Forms of Non-verbal Communication, Kinesics, Facial Expression, Posture, Oculesics, Appearance and Artefacts

Technology Enabled Communication: Technology based Communication Tools, Positive Impact of Technology Enabled Communication, Negative Impact of Technology Enabled Communication, Effectiveness in Technology based Communication

UNIT – II: Language Skills for Effective Communication [20%]

Verbs and Subjects, Tenses, Use of Preposition and Conjunctions. Punctuation and Capitalization.

UNIT – III: Oral Communication Skills [20%]

Business Presentations & Public Speaking: Planning-Structuring-Delivery of Presentations, Introduction-Main Body- Conclusion of Presentations, Controlling Nervousness and Stage Fright

Conversations: Importance of Conversations, Essentials of Conversations, Non-verbal Cues in Conversations

Interviews: General Preparation for an Interview, Success in an Interview, Types of Interviewing Questions, Important Non-verbal aspects, Types of Interview.

Meetings: Purpose of Meeting, Planning a Meeting, Meeting Process, Leading Effective Meetings, Evaluating Meetings, Minutes Negative Impact of Technology Enabled Communication, Effectiveness in Technology based Communication

UNIT – IV: Business Writing & Resume Building [20%]

Business Writing: Importance of Written Business Communication, Direct and indirect Approaches to Business Message, Five Main Stages of Writing Business Messages.

Business Correspondence: Basic Principles, Common Components of Business Letters, Strategies for Writing Body of a Business, letters, Kinds of Business Letters, Writing Effective Memorandums.

Instructions (Notice): Written Instructions, Format Instructions, Product Instructions

Resumes: Resume Formats, Traditional-Electronic-Video Resumes, Sending Resumes, Follow-Up letters.

UNIT – V Technical & Research Writing [20%]

Technical Writing: Audience Recognition/ Analysis, Language, Elements of Style, Techniques for good technical writing

Reports: Characteristics of a Report, Categories of Reports, Formats, Prewriting, Structure of Reports (Manuscript format), Types of Reports, Writing the Report

Proposals: Purpose, Types, Characteristics, Structure, Style and Appearance, Evaluation of Proposals

Research Paper, Dissertation & Thesis: Characteristics and Components of Research paper, Features-Action plan-structure of Dissertation, Thesis outline-organization-timetable-Iteration-Style-Presentation

Text Books(s):

1. Business Communication, 2nd Edition, Meenakshi Raman, Prakash Singh, OXFORD
2. Technical Communication – Principles and Practice, 2nd Edition, Meenakshi Raman, Sangeeta Sharma, OXFORD

Reference Books:

1. Technical Communication – A Practical Approch, 6th Edition, William Sanborn Pfeiffer & T V S Padmaja, PERSON
2. Communication Skills for Engineers and Scientists, Sangeeta Sharma & Vinod Mishra, PHI
3. Effective Technical Communication, M Ashraf Rizvi, Tata McGRAW HILL

List of Possible Assignments:

1. **Write a personal essay and or resume or statement of purpose which may include:**
   - Who am I (family background, past achievements, past activities of significance)
   - Strength and weakness (how to tackle them) (SWOT analysis)
   - Personal Short-term Goals, long-term goals and action plan to achieve them
   - Self-assessment on soft-skills

2. **Student could review and present to a group from the following ideas**
   - Book review
   - Biographical Sketch
   - Any topic such as an inspirational story/personal values/beliefs/current topic
   - Ethics and etiquettes and social responsibilities as professional.

3. **Student will present to a group from the following ideas**
   - Multimedia based oral presentation on any topic of choice (Business/Technical)
   - Public speaking exercise in the form of debate or elocution on any topic of Choice

4. **Student will undergo two activities related to verbal/non-verbal skills from Following**
   - Appearing for mock personal interviews
   - Participating in group discussion on current affairs/Social Issue/ethics and etiquettes
   - Participating in games, role-playing exercises to highlight nonverbal skills.

5. **Student will submit one technical document from the following:**
   - Project proposal
   - Product brochure
   - Literature survey on any one topic
   - User Manual
   - Technical Help

6. **Student will submit one business document from the following**
   - A representative official correspondence
   - Minutes of meeting
   - Work progress report

7. **Students will participate in one or two activities from following:**
   - Team games for team building
   - Situational games for role playing as leaders, members
   - Organizing mock events
   - Conducting meetings

8. **Faculty may arrange one or more sessions from following:**
   - Yoga and mediation
   - Stress management, relaxation exercises and fitness exercises
   - Time management and personal planning sessions
   - Improving memory skills
   - Improving leadership skills
   - Improving English conversation skills
   - Reading comprehension skills & notes taking skills

9. **Students' own SWOT Analysis**

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – II)

Subject Name: Data and File Structures – MCA201

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Rationale (Course Objective) :

The purpose of this course is to provide the students with solid foundations in the basic concepts of programming: data structures and algorithms.

Learning Outcome:

The course guides the students

- To write programs in data and file structure with there applications
- To apply the concepts of data structure and to solve the practical problems
- Knowledge of file and to process the files will be revealed
- Practical based approach in data structure using C or C++

METHODOLOGY:

- Teaching would be mainly based on two way interactions & discussions.
- Practical guidelines given individually
- Students should give presentation in their subject which will enhance the subject knowledge and communication skill

Instructional Strategies:

- Generally lecture method will be adapted.
- Teaching aids such as OHP and LCD projectors will be used.
- Emphasis on self study will be handled through seminars.

Course Content:

Unit 1 Data Structures (20%)

Introduction – Arrays – Structures – Stack: Definition and examples, Representing Stacks – Queues - Linked Lists – Representation – Operations – Single Linked list – Double linked list – circular linked list - Applications of Stack, Queue and Linked Lists.

Unit 2 Trees

(20%)

General trees - Binary Trees – Binary Tree Representations – traversing binary trees – Binary search tree – AVL trees - node representation: Inserting nodes – deleting node nodes

Unit 3 Sorting and Searching (20%)

Binary search – Introduction to sorting: A Selection sort – An Insertion sort – An Exchange sort: The Bubble Sort – Merge sort – The Partition Exchange sort (Quick sort) – The Heap sort

Unit 4 Graphs (20%)

Definition – Representations of graph – Graph Traversal – An application of graphs – Shortest path algorithm - Dijkstra's algorithm – An application of scheduling – Critical Paths – Spanning Trees – Kruskal's Algorithm, Prim's Algorithm

Unit 5 File Systems and Hashing

(20%)

Files – File organization – File operations –Sequential file organization: Definition – Storing Sequential Files – Declaring Sequential Files – Creating, retrieving, updating sequential file – Relative File Organization: Definition – Addressing technique – direct Mapping Technique – Directory Lookup technique Indexed Sequential File Organization: Definition – Applications – Examples – Physical layout Indexes. Hashing: Hash Function – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing

Text Books:

1. Data Management and File Structure by Mary E. S. Loomis using Prentice Hall of India
2. Weiss "Data Structures and Algorithm Analysis in C", Addison Wesley, Second Edition using Pearson Education Asia.

Reference Books:

1. Robert Kruse & Clovis L. Tondo "Data Structures and Program Design in C", Prentice Hall, 2nd edition. 1991.
2. Classic Data Structure – D. Samanta in Prentice Hall of India

Practical: Any 'C' compiler will be used for practical programs

Practical List for DFS:

1. Represent the given sparse matrix using one dimensional array and linked list.
2. Create a Stack and do the following operations using arrays and linked lists
   (i) Push (ii) Pop (iii) Peep
3. Create a Queue and do the following operations using arrays and linked lists
   (i) Add (ii) Remove
4. Polynomial addition & multiplication using array and linked list
5. Circular Queue implementation using array & linked list
6. Implement the operations on singly linked list, doubly linked list and circular linked list.
7. Tree traversal using recursive and non-recursive
8. Create a binary search tree and do the following traversals
   (i) In-order (ii) Pre order (iii) Post order
9. Implement the following operations on a binary search tree.
   (i) Insert a node (ii) Delete a node
10. Sort the given list of numbers using all sorting techniques
11. Perform the following operations in a given graph
    (i) Depth first search (ii) Breadth first search
12. Find the shortest path in a given graph using Dijkstra algorithm
13. Find the shortest path in a given graph using Kruskal's Algorithm
14. Find the Minimum spanning tree

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – II)

Subject Name: Operating Systems – MCA202

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
4	3	2	25	25	50	50	150

Rationale (Course Objective):

The primary objective is to impart knowledge about fundamental principles and design issues of Operating Systems. A practical implementation of Operating system concepts using UNIX based C programming.

Learning Outcome:

This course will enable to:

- → Have a good orientation towards concept-based approach and practical-based approach
- → Students will be able to describe the components of a modern operating system
- → Explain how they interact with the computer hardware
- → Apply operating system concepts practically
- → Apply the concepts of operating systems design to practical problems.
- → Know the basic theories of all operating systems structure and how an operating system manages the computer systems.

Instructional Strategies:

- → Generally lecture method will be adapted.
- → Teaching aids such as OHP and LCD projectors will be used.
- → Emphasis on self study will be handled through seminars.
- → Case study discussion on selected topics

Course Contents:

Unit I: Introduction to Operating System: (25%)

Introduction to Operating System: History of Operating Systems, Operating System Concepts, System Calls, Operating System Structure.

Processes and Threads: Processes, Threads, InterProcess Communication, Scheduling.

Unit II: Memory Management: (15%)

Memory Management: A Memory Abstraction, Virtual Memory, Page Replacement Algorithms, Segmentation.

Unit III: File System and Input / Output: (20%)

File Systems: Files, Directories, File System Implementation, File System Management and Optimization.
Input/Output: Principles of I/O Hardware, Principles of I/O Software, I/O Software Layers, Disks, User Interfaces.

Unit IV: Deadlock and Multiple Processor Systems (20 %)

Deadlocks: Introduction to Deadlocks, Resources, Deadlock Avoidance, Deadlock Prevention and Other Issues.
Multiple Processor Systems: Multiprocessors, MultiComputers, Virtualization

Unit V: Security: (20 %)

Security: The Environment, Basics of Cryptography, Protection Mechanisms, Authentication, Insider Attacks, Malware.
Case Studies: Linux, Windows Vista and Symbian OS

Text Books:

1. " Modern Operating Systems", by Andrew S.Tannenbaum, PHI, 3rd Edition

Reference Books:

1. "Operating System Concepts", William Stallings, Pearson, 5th Ed
2. "Operating Systems", Madnick E., Donovan J., Tata McGraw Hill, 2001

Practical List:

Practical 1:

1. Configuring Operating System
2. Basic UNIX Commands

Practical 2 – Process:

3. Header files: Process creation and Process joining
4. Create processes using fork() and check different states i.e. zombie, orphan
5. Sum of numbers from 1 to 10, by dividing the job into two processes(parent and one child)
6. Copy the contents of one array to another.
7. Create two child processes and display the output.
8. Program to add four integer values using 2 process
9. Program to find out the factoids of a number
10. Program to fork a child and print the process id of parent and child process

Practical 3 – Thread:

11. Program to create a thread and join the thread
12. Create four threads and print its output.
13. Program to find whether the number is Prime or not
14. Program to find factorial of the given numbers using threads.
15. Sum of numbers using thread
16. Program to find maximum number from the integer numbers using thread
17. To find the total no of prime numbers between 1 to n by using thread.

Practical 4 – Scheduling:

18. Implement ROUND ROBIN algorithm for CPU scheduling.
19. Implement Shortest Job First algorithm for CPU scheduling.

20. Implement First Come First Serve algorithm for CPU scheduling.
21. Implement Priority for CPU scheduling algorithm

Practical 5 – IPC:

22. Implement IPC using pipe to read and write a string from the user.
23. Using pipe print odd and even numbers.
24. Read n number of characters and print the characters using IPC

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – II)

Subject Name: Object Oriented Concepts & Programming – MCA203

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Rationale (Course Objective) :

* To introduce Object oriented concepts and programming so that the student can work on any object oriented language in the future.
* To give hands on knowledge of visual object oriented programming.

Learning Outcome:

Students will learn the object oriented concepts. They will understand the different features of C++. They would be able to model real world problems through C++ programming.

Instructional Strategies:

To fulfill the aim of the subject, theory as well as practical sessions will be conducted. The act of learning can be improved by using audio-visual aids like OHP and LCD Projector. Apart from these regular seminars and case studies will also be conducted.

Course Content:

UNIT – 1 **Object Oriented Concepts** **[20%]**

Object Oriented Development; Objects and Classes; Generalization and Inheritance; Polymorphism and Virtual Functions

UNIT – 2 **Classes, Constructors and Destructors** **[20%]**

A Simple Class; Objects as Physical Objects & as Data Types; Constructors; Objects as Function Arguments; returning Objects from Functions; Arrays of Objects.

UNIT – 3 **Operator Overloading and Inheritance** **[20%]**

Overloading Unary Operators; Overloading Binary operators; Data conversion; Inheritance: Derived Class and Base Class; Derived Class Constructors; Overriding Member Functions; Public and Private Inheritance; Levels of Inheritance; Multiple Inheritance; Containership: Classes within Classes.

UNIT – 4 **Pointers, Virtual Functions and File Handling** **[20%]**

Addresses and Pointers; Pointers and Arrays; Pointers and Functions; Pointers and Strings; Memory Management : new and delete; Pointers to Objects; Pointers to Pointers; Virtual Function; Friend Functions; Static Functions; The this Pointer; Streams; String I/O; character

I/O; Object I/O; I/O with Multiple Objects; File Pointers; Disk I/O with Member Functions; Multi File Programs.

UNIT – 5 Templates, Exception Handling and Namespaces [20%]

Generic Classes, Creation of Generic Classes, Multiple Arguments with Template, Generic Functions, Multiple Arguments with Generic Functions, Overloading of Template Functions, Exception Handling Mechanism, Multiple Catch Handler, Creation of Namespaces, Nesting of Namespaces, RTTI usage.

Text Books:

1. Object Oriented Programming with C++ by E. Balagurusamy

Reference Books:

1. Object Oriented Programming in Turbo C++ by Robert Lafore (Galgotia - 1994)
2. Complete Reference C++ by Herbert Schildt - forth edition

Practical: Any 'C++' compiler will be used for practical programs

List of Practical:

1. Write a C++ program that will ask for a temperature in Fahrenheit and display it in Celsius.
2. Define a class for Student. Enter data - roll no., name, age, semester and percentage for **five** students and display it.
3. Write a program to store values in one array, sort it and store it in another array. Display both the arrays. (Write a function for sorting)
4. Construct m x n matrix using class and find the (1, 2) element of the matrix. (Take the choice from user to display the element).
5. Write a program using a friend function to add two values defined in different classes.
6. Write a program using a friend function to exchange two values defined in different classes.
7. Write down a class shape which has three member functions with same name which calculates the area of three shapes.
    a. Triangle – ½ x l x b
    b. Rectangle – l x b
    c. Circle – 3.14 x r^2

    (Use function over loading)
8. Write a program to add and subtract two complex numbers. (Use all type of constructors and use destructor to destroy them.)
9. A book shop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book, the sales person inputs the title and author, and the system searches the list and displays whether it is available or not. If it is available then system displays the book details otherwise the message – "Book not available." Design a class ***book*** with suitable member functions and constructors. Use ***new*** operator to allocate memory space required.
10. Extend the above program. If the book is available then system displays the book details and requests for the number of copies required. If the required copies are available, the total cost of copies is displayed otherwise the message – "Requested copies not in stock."
11. Write a C++ program to overload '>=' operator using member functions. Also overload '*' operator using only friend function.

12. Create a Class – '**Student**' with appropriate data members and member functions. Derive the classes – '**Test**' PUBLICLY from the above class. Derive another classes – '**Result**' PRIVATELY from the '**Test**' class. Enter data of students. Also enter data for Test conducted.
    a. Ask the name of the Student from the user and display his / her result.
    b. Display the records of all the students who failed in the test.

Use File Management for following programs:-

13. Write a program that stores all ASCII values in file and display it on the screen.
14. Create a class inventory with data member name, code and cost. Store this data in file and display it on console. Use manipulators like 'setw' and 'setprecision' for displaying data.
15. Write a program for implementing Employee Management System through the use of Virtual Functions. Create class Company, Employee and Salary. Use functions – **show( )** for displaying data on console and **search( )** to search the details of a particular employee. The program should be menu driven.
16. Write a program for implementing Airline Reservation System through the use of Virtual Functions. Create class **Airport**, **Flight** and **Passengers**. Use functions – **show( )** for displaying data on console and **search( )** to search the details of a particular Passenger. The program should be menu driven.
17. Write a program for generic function with specific type of arguments to calculate Addition, Subtraction and Multiplication of the data.
18. Write a class template to represent a generic vector. Include member functions to perform the following tasks:-
    1. To create the vector
    2. To modify the value of a given element
    3. To multiply by a scalar value
    4. To display the vector in the form (10, 20, 30, ...)
19. Write a program to generate different type of Exceptions when checking the value.
20. Write a program with the following:-
    1. A function to read two double type members from keyboard.
    2. A function to calculate the division of these two numbers.
    3. A try block to throw an exception when a wrong type of data is keyed in.
    4. A try block to detect and throw an exception if the condition "divide – by – zero" occurs.
    5. Appropriate catch blocks to handle the exceptions thrown.
21. Define a class Person with data members as name of the person, names of parents of the person, gender, age, and an array-containing list of interests. Provide member functions FindFather, FindMother, FindUncle and FindAunty functions, all of which returns the object of person class. Provide access using function pointer for all these functions. Use Exception Handling techniques to handle errors.
22. For a supermarket, define a bill class. All the bill objects will contain bill number, name of clerk preparing the bill, each item with quantity and price, total amount to be paid. Total items in the bill vary. Define dynamic memory allocation constructor for bill class such that any number of items from 1 to 50 can be accommodated in a single bill. There is an array describing each item with price. Price is to be picked up from that array. Now overload = operator and provide reasons for need of such operator. Use Exception Handling techniques to handle errors.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – II)

Subject Name: Computer Oriented Numerical & Statistical Methods – MCA204

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	-	25	25	50	-	100

Rationale (Course Objective) :

- To solve linear and non linear algebraic equations, perform operations of calculus, fit curves and solve differential equations, also using a computer.
- To appreciate problems due to rounding errors and convergence.
- To develop familiarity with the different statistical methods used in problem solving and decision making.

Learning Outcome:

At the end of the course,

- Students will get acquainted with the different numerical methods used in problem solving.
- Students will develop logical understanding through the concepts learned in the class, which is the base of computer science.
- Students will get acquainted with essential ideas and reasoning of applied statistics like data analysis, distributions and inference theory.
- Students will learn a statistical techniques through different tools and apply it to case studies using the concepts learned in the class

Instructional Strategies:

Generally lecture method would be applied for classroom teaching, where how to solve problems related to every numerical method would be demonstrated. Also tests would be given to strengthen the concepts, at regular intervals of time.

Course Content :

Unit 1: Computer Arithmetic & Iterative Methods (20%)

Floating Point representation of numbers, Normalized floating point numbers, Errors in numbers, Solution of Linear and transcendental equations, False Position, Newton Raphson methods.

Unit 2: Interpolation and Approximation (20%)

Lagrange's interpolation, Forward difference, backward difference, Inverse interpolation, Linear Regression and Non-Linear Regression (Least square Curve fitting), Numerical Differentiation : Newton's forward and backward difference formulae,

Unit 3: Solution of Simultaneous Equations & Ordinary Differential Equations (20%)

Gauss Elimination method, Gauss Seidal iterative method, Euler's Method, Runge-Kutta second order method. Numerical Integration: Concept of Numerical Integration by Simpson's 1/3 rule& 3/8 rules.

Unit 4: Measures of Central tendency, dispersion and Probability (20%)

Introduction to measures of central tendency - mean, median, mode, measures of dispersion, standard deviation, Probability, addition rule, mutually exclusive events, multiplication rule, probability under statistical independence, probability under statistical dependence, conditional probability. Probability distributions-binomial, poisson and normal distribution

Unit 5: Statistical inference theory (20%)

Sample distributions, Testing of hypothesis, one tail and two tail tests, tests of significance (about mean) , Parametric &non-parametric tests, Tests of Significance: Chi square test of independence ,t test

Text Books:

1. "Numerical Methods" – E. Balaguruswamy (TMH publications)
2. Srimanta Pal, "Numerical Methods", Oxford University Press
3. Richard Levin, David Rubin, "Statistics for Management", 7th edition, PHI
4. Anderson Sweeney Williams, "Statistics for Business and Economics'',11th edition

Reference Books:

1. Steven C Chapra, Raymond P Canale, "Numerical Methods for Engineers", 5th Edition, Tata McGraw Hill Publication, Special Indian Edition
2. "Computer Oriented Numerical Methods"-Dr B.S Grewal
3. "Numerical Methods – Problems and Solutions" – M. K. Jain and R. K. Jain
4. "Computer Oriented Numerical Methods" – V. Rajaraman (PHI publications)
5. S.P Gupta, "Statistical Methods'',Himalaya Publication

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – II)

Subject Name: System Analysis & Design and Software Engineering – MCA205

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	-	25	25	50	-	100

Rationale (Course Objective):

- To know about different System Development Methodologies.
- Basic concepts of system designing and analyzing.
- To apply the knowledge of a disciplined approach to the development of software and to the management of the software product lifecycle

Learning Outcomes:

- Independent Analysis, Design & Implementation of System.
- Define & analyze business situations.
- Issues to consider while signing a Contract for Development.
- To create models of software data and processes using object oriented modeling approaches such as the UML
- To describe and evaluate software tools and technology to enhance productivity and quality of software development
- To demonstrate skills of software documentation, quality assurance and evaluation, and testing as part of software development

Instructional Strategy:

1. Direct Instruction
2. Guided Practice
3. Independent Practice
4. Demonstration
5. Problem Solving
6. Use of graphics organizers
7. Case Studies

Course Content :

Unit-1: Introduction to Information Systems **(20%)**

- Introduction & need for SAD
- Concept of System, Characteristics, Types & Control Elements of System.
- Information Systems & its categories, Types of Users.
- System Analysis, Responsibilities & Attributes required in System Analyst
- Managing Project Review & Selection.

Unit-2: System Development & System Design **(20%)**

- System Development Strategies (SDLC, System Prototyping & SSADM)
- Cost Benefit Analysis.
- Fact Finding Techniques with pros & cons
- Tools for Documenting Procedures & Actions
- Design of Input & Control, Design of Files.

Unit-3: Software Engineering – Analysis & Design **(20%)**

- Process Models and framework
- UML Diagrams – Use case, Activity, Class, State Transition, Sequence & Component
- Creating An Architectural Design: Software Architecture, Data Design, Architectural Styles and Patterns
- Interface Design: Golden Rules, Interface Design steps – Design Steps and Issues

Unit-4: Software Engineering - Testing **(20%)**

- Testing Strategies: Strategic approach for Software Testing, Strategic Issues, For Conventional Software, Validation, System testing, Art of Debugging
- Testing Tactics: Testing Fundamentals, Black Box Testing, White Box Testing, Stress Testing, Performance Testing, Alpha Beta Testing, Software Testing Tools and Case Studies base on System Development

Unit-5: Quality Assurance & System Implementation **(20%)**

- Software Quality Assurance – Quality Concepts, Software Reliability, Quality Standards and Software Certification
- Audit Trail
- Documentation Standards
- User Training
- Post Implementation Review

TEXT BOOK:

1. Analysis & Design of Information Systems by James .A. Senn, Tata McgrawHill, Second Edition
2. Roger .S. Pressman "Software Engineering: A Practitioners Approach", 5e, TMH.

REFERENCE BOOKS:

1. System Analysis & Design by Elias M. Awad
2. Workbook on System Analysis & Design by V.K Garg.
3. System Analysis & Design by Kendall & Kendall
4. Sommerville, "Software Engineering", 6e, PEA
5. Pfleeger, "Software Engineering: Theory and Practice", PEA.
6. Peter Pedrycz, "Software Engineering: An Engineering Approach", John Wiely.
7. Ghezzi, Jazayere, "Fundamentals of Software Engineering", 2e, PHI.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – II)

Subject Name: Foundation In Networking – MCA206

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	-	25	25	50	-	100

Rationale (Course Objective) :

- To introduce the concept of electronic data transmission, the representation of data in a transmission system and the design of communication methods in a distributed computer system.
- To discuss the possible network configurations and control strategies necessary for various applications. Protocols, architectures and transmission alternatives, communication environment, regulatory issues, network pricing and management.

Learning Outcome:

Students will learn the networking concepts. They will understand

- The different topologies of a network
- What is OSI model, its layers
- Routers and Routing Algorithms
- Encryption Methods

Instructional Strategies:

To fulfill the aim of the subject, theory as well as practical sessions will be conducted. The act of learning can be improved by using audio-visual aids like OHP and LCD Projector. Apart from these regular seminars and case studies will also be conducted.

Course Content :

UNIT – 1 **Fundamentals of Data Transmission, Communication Media [20 %]**

Basics of Network, History of Networks, Network Topology; LAN, MAN, WAN, Rules, Models - OSI Model & TCP/IP Model, The Physical Medium – Guided and Unguided Media, Internet through Cable, Mobile Architecture

UNIT – 2 **Error Detection and Correction, Communication Protocols [20 %]**

The Nature of Errors; Parity; Cyclic Redundancy Codes; Dealing with Errors, Data Link Layer Protocols.

UNIT – 3 **MAC layer and Network layer** **[20 %]**

ALOHA, CSMA\CD, WDMA, MACA and MACAW Protocols, Routing Protocols – Shortest Path Routing, Distance Vector Routing, Link State Routing

UNIT – 4 **Transport layer and Application Layer** **[20 %]**

TPDU, Three Way Handshake, Two-Army Problem, DNS, Name Servers, Resolvers, E-mail, SMTP, MIME, POP3

UNIT – 5 **Network Security** **[20 %]**

Security Features, Cryptography, Cipher Modes, RSA algorithm

Text Book:

1. Computer Networks By Andrew S. Tanenbaum, Latest Edition
2. Data Communication Networking By Behrouz Forouzan Fourth Edition, Publication: - Tata McGraw Hill (**Only one Chapter – Error Detection and Correction**)

Reference Books:

1. Data Communication Networking By Behrouz Forouzan Fourth Edition, Publication: - Tata McGraw Hill

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – I (Semester – II)

Subject Name: Seminar – MCA207

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
1	4*	2	0	50	0	0	50

Rationale (Course Objective) :

The purpose of this course is to provide the students with solid foundations in Presentation skills.

Learning Outcome:

The course guides the students

- To prepare presentations
- To present various topics
- To use various tools & technologies to prepare the presentation

Instructional Strategies:

Theory sessions would acquaint students with the basic concepts of preparing a presentation utilizing the concepts of presentation skills. Practical sessions allotted would ensure that the students conduct seminars under the guidance of faculty members.

Seminar Topics:

The topics include –

Computer Peripherals, Networking, Social Networking, Google Search, Search Engine Optimization and any other related to Computer Science

Criteria for Evaluation of Seminars

Seminar Content : 30%

Use of Presentation Tools : 30%

Presentation Skills : 40 %

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – III)

Subject Name: Object Oriented Technology - I (Java)– MCA301

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Objectives:

1. To emphasize on the use of object oriented technology and the paradigm (Core Java is taken as the platform to describe the technology) and the importance of practical oriented learning.
2. To develop proficiency among students in creating console based and GUI based applications using the Java Programming Language.
3. To give the flavor of "Write Once, Run Anywhere" concept to the students
4. To give students a good understanding of developing multi-threaded applications using the Java Programming Language.

Learning Outcome:

At the end of the course, student will be able to:

1. Become comfortable with object oriented programming: Learn to think in objects
2. Understand the use of APIs in robust, enterprise three level application developments.
3. Understand the essentials of the Java class library, and understand how to learn about other parts of the library when you need them.
4. Develop event driven Graphical User Interface (GUI) programming

Prerequisites: Working/Basic knowledge of Object Oriented Programming Language (C++)

Course Contents:

UNIT – I **[20%]**

EVOLUTION AND OVERVIEW OF JAVA

Java's Lineage, The creation of Java, How Java changed the Internet, Java's magic : The Bytecode, The Java Buzzwords, The evolution of Java, The Three OOP principles, A First Simple Program, Lexical Issues, Difference between object-oriented programming language and object-based programming language.

DATA TYPES, VARIABLES, ARRAYS AND INBUILT CLASSES

The Primitive types, Integer Types, Floating-Point Types, Character Type, Booleans, Literals, Variables, Type Conversion & Casting, Automatic Type Promotion in Expressions, Arrays, Wrapper Classes, java.util classes: Date, Calander, Math, Scanner

OPERATORS

Arithmetic operators, Bitwise operators, Relational operators, Boolean Logical operators, Assignment operator, '?' Operator, Operator Precedence, Using Parenthesis

CONTROL STATEMENTS

Java's Selection Statements, Iteration Statements, Jump Statements

INTRODUCING USER DEFINED CLASS

Class Fundamentals, General Form of a Class, Simple Class Example

UNIT – II **[20%]**

INTRODUCING USER DEFINED CLASS (Conti….)

Declaring objects, Introducing methods, Constructors, The this keyword, Garbage collection, The finalize() method, Overloading methods, Understanding static, Introducing final, Using command line arguments

INHERITANCE

Inheritance Basics, Using super, Method overriding, Dynamic Method Dispatch, Using Abstract Classes

PACKAGES & INTERFACES

Packages - Defining a Package, Access Protection, Importing Packages, Interfaces – Defining an Interface, Implementing Interfaces

UNIT – III **[20%]**

INPUT OUTPUT

I/O Basics, Reading Console Input – Reading characters, Reading Strings, Reading & Writing files, File - Directories.

JAVA FEATURES - OTHER TOPICS:

The transient and volatile Modifiers, Using instanceof, strictfp, Using assert, Static Import, Invoking Overloaded Constructor Through this().

INPUT OUTPUT: Exploring java.io

The Stream Classes, The Byte streams – InputStream, OutputStream, FileInputStream, FileOutputStream, Buffered Byte streams- BufferedInputStream, BufferedOutputStream, The Character streams - Reader, Writer, FileReader, FileWriter, BufferedReader, BufferedWriter.

STRING HANDLING

The String Constructors, String Length, Special String Operations - String Literals, String Concatenation, Character Extraction - charAt(), getChars(), String Comparison - equals() and equalsIgnoreCase(), compareTo(), Searching Strings, Modifying a String, StringBuffer – StringBuffer Constructors, length() and capacity(), append(), insert(), delete(), deleteCharAt(), replace().

UNIT – IV **[20%]**

EXCEPTION HANDLING

Exception handling fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, Java's Built-in exceptions, Creating your own exception sub classes.

MULTITHREADED PROGRAMMING

Java Thread Model, Creating a Thread – Implementing Runnable, Extending Thread, Creating Multiple Threads, Thread Priorities, Synchronization – using synchronized methods, Inter thread Communication, Suspending, resuming and Stopping Threads.

UNIT – V **[20%]**

THE COLLECTIONS FRAMEWORK

Generics types, Collections Overview, The Collection Interfaces - The List Interface, The Set Interface - HashSet , TreeSet Map Interface- HashMap, TreeMap, The Collection Classes – ArrayList Class, HashSet Class.

INTRODUCING SWING

The Origins of Swing, Two Key Swing Features, Components & Containers - Understanding Layout Managers – FlowLayout, BorderLayout, GridLayout, CardLayout, GridBagLayout, The Swing Packages, A Simple Swing Application, differentiate Swing & Applet, GUI Events-Event Delegation Model, and Exploring Swing Components.

Text Book(s):

1. The Complete Reference Java, Herbert Schildt, TMH, Seventh Edition

Unit wise Coverage from Text book(s):

Book 1: **Unit 1:** Chapter: 1,2,3,16(Page:386 to 398,415),18, 4,5,6
Unit 2: Chapter: 6 (Continue),7,8,9
Unit 3: Chapter: 13,19,15
Unit 4: Chapter: 10,11(Full)
Unit 5: Chapter: 17(Selected Topics),22,29,30

Other Reference Books:

1. Java Programming ,Hari Mohan Pandey,Pearson Publication
2. The Java Hand Book, Patrick Naughton, TMH, Eleventh Reprint, 2002

Experiment List:

UNIT-1:

- Observe the interaction involved in the process of booking a bus ticket. Identify the various objects involved and the interaction between the objects in order to solve the problem of bus ticket booking.
- Demonstration of wrapper classes and the related data types
- Convert binary number to decimal equivalent and print it.
- Convert decimal number to binary equivalent and print it.
- Demonstration of logical, relational and shift operators.

UNIT-2:

- Write a program to make use of a parameterized method inside a class. Take the following case: Create a class Box and define a method in this class which will return the volume of the box. Initialize two objects for your class and print out the volumes respectively.
- Write a program to store values in one array, sort it and store it in another array. Display both the arrays. (Write function for sorting. Apply Selection sort.)
- Write a super class called SquareArea with a method named area (double area) which calculates the area of square. Create one subclass calls CubeArea with an overriding method named area (double area) which calculates the area of cube.
- Write a program to calculate the simple interest and compound interest using abstract class as well as interface.
- Create Package for any one of the above programs or take a case study.

UNIT-3:

- Write a program that takes the marks of subjects from user, calculates the percentage and displays the result on screen. (Use I/O classes and its methods)
- Write a program that will count the number of characters, words and lines present in a file.
- Write an application that reads two different strings from two different files and write the concatenated string into another file. All file names must be given as command line arguments.
- Taking a case study show the demo of various string methods using mutable and immutable classes.

UNIT-4:

- Write a program to sort the given set of integers in ascending order. Include a try block to find the array out of bounds exception and catch it.
- Write a program to create a Student class. If the mark is greater than 100 it must create an exception called MarkOutofBounds Exception and throw it.
- Write an application illustrating how a program can wait for threads to complete. The ThreadM class extends Thread class and displays a string every second for 10 iterations. The ThreadN class also extends Thread class and displays a string every two seconds for 20 iterations. The main( ) method creates and starts these two threads and displays a message after they have both completed.
- Write an application that demonstrates two threads at different priorities showing the lowest and highest priority.

UNIT-5:

- Design a text editor similar to notepad using swing.
- Write java application using slider control to change the current Fahrenheit to centigrade and display the result in Jlabel
- Taking a case study show the use of all the components and containers

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – III)

Subject Name: Web Development Tools - I MCA302

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Objectives:

a. To develop basic knowledge of designing and developing client server architecture based applications and web applications

b. The purpose of this course is to give students an understanding of both the Applications. This course covers some advanced topic in ASP.NET, so that student can develop projects for the industry.

Learning Outcome:

This Course Covers -

a. Web Application Architecture
b. Using Server & HTML Controls
c. Using Master pages & Themes
d. Working With Database
e. Securing Web Application
f. ASP.NET Web Services
g. Mobile Application development

Course Contents:

Unit 1: Introduction to Client Server Architecture & Visual Basic.Net (20%)

What is Client Server Architecture? Real client server architecture, 2-tier v/s 3-tier architecture. Visual Basic: Exploring IDE, Creating First VB Application, IDE Components and Building Console Application.

Unit – 2: ASP.NET Essentials (20%)

ASP.NET Essentials, Developing a Web Application, Standard Controls – I

Unit – 3: Various Controls (20%)

Standard Controls - II, HTML Controls, Navigation Controls, Validation Controls, Login Controls, Master Pages & Themes

Unit – 4: Working with Database (20%)

Working with ADO.NET, Overview of Data Objects, Understanding Data Source Controls, Working with Databound Controls

Unit – 5: Advanced Topic (20%)

Understanding User Profiles, Caching, Dealing with web services using XML files. Developing Mobile Application, Tracking & securing Websites.

Text Book(s):

1. ASP.NET 4.0 Black Book, Dreamtech Press
2. Mastering Visual Basic 2008 – Evangelos Petroutsos, Wiley India.

Other Reference Books:

1. ASP.NET Website Programming: Programs - Design – Solution
2. ASP.NET in a Nutshell
3. Teach Yourself ASP.NET in 24 Hours

Experiment List :

Creating a Web Site Master Pages, &Themes

Exercise 1 Create a e-Website
Exercise 2 Create a Master Page
Exercise 3 Theme the Web Site's Pages

Using Controls

Exercise 4 Add Multiple Views
Exercise 5 Build the Main Content Page
Exercise 6 Build the Product Pages
Exercise 7 Build the Check-Out Page
Exercise 8 Build the Thank-You Page
Exercise 9 Use the Web Site Administration Tool to configure website

Data Access

Exercise 10 Create webshop Database
Exercise 11 Create Stored Procedure
Exercise 12 Create Data Access Layer
Exercise 13 Create Classes for category & Products
Exercise 14 Create an Admin Page

Membership, Login Controls, and Role Management Page

Exercise 16 Apply Authentication and Authorization Settings
Exercise 17 Add Navigation Links to the Master Page
Exercise 18 Enable Role-Based Security, Employ Security Trimming, Add a Sitemap Path

State Management & Reports

Exercise 19 Add Visitor Counter
Exercise 20 Create Reports.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – III)

Subject Name: Advanced Database Management System – MCA303

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Description:

The primary objective of this course is to provide in-depth knowledge of the SQL concepts and through exposure to PL/SQL database programming language.

Learning Objectives:

Students will learn Five components like Advanced SQL and Introduction to PL/SQL, Basic features of PL/SQL, Data retrieval and Exception handling in PL/SQL, Creating and managing named PL/SQL blocks (Procedure, function, package and triggers) and Advanced features of PL/SQL at the end of this course, which is as under:

1. In "Advanced SQL and Introduction to PL/SQL" they will learn enhancement of group by clause, advance sub-queries, indexes, two tier and three tire client/server application models and need of PL/SQL.
2. In "Basic features of PL/SQL" they will learn block structure of PL/SQL, variable declaration, datatypes and operators in PL/SQL, etc… .
3. In "Data retrieval and Exception handling in PL/SQL" they will learn how to retrieve data using cursor and how errors are handled in PL/SQL.
4. In "Creating and managing named PL/SQL blocks" they will learn how to create and use Procedures, Functions, Packages and Triggers.
5. In "Advanced features in PL/SQL" they will learn how to create and manage collections, large objects, bulk binds and the functionalities of dbms_SQL package.

Prerequisites :

1. Basic knowledge of database management system
2. Basic knowledge of SQL

UNIT-I : Advanced SQL and Introduction to PL/SQL [20%]

- Enhancement to Group by clause: Group by using Cube and Rollup

- Advanced Sub-queries: Multiple column sub-queries , Sub-queries in FROM clause, Scalar and correlated sub-queries, Sub-query in CASE Expressions and in an ORDER BY clause, Using EXISTS/NOT EXISTS Operator
- SQL performance Tuning: Indexes ,Multiple Indexes on a table, Using ROWID to delete duplicate rows from a table, Using ROWNUM in SQL statements, Views, Creating Sequences
- Introduction to PL/SQL : Why PL/SQL, Features of PL/SQL, Application models and PL/SQL

UNIT-II : Basic PL/SQL Features [20%]

- PL/SQL basic block structure
- Language fundamentals : Lexical Units, Variable declaration, PL/SQL datatypes, Expressions and Operators
- PL/SQL Programming construct: PL/SQL control structures, PL/SQL records
- SQL within PL/SQL : DML in PL/SQL, Pseudo columns, GRANT and REVOKE, Transaction control

UNIT-III : Data retrieval and Error handling in PL/SQL [20%]

- Data retrieval using Cursor: Explicit and Implicit cursor, cursor fetch loops and cursor variables.
- Error handling: Declaring and Handling exceptions, Raising Exceptions, The EXCEPTION_INIT pragma, Using RAISE_APPLICATION_ERROR statement, Exception propagation

UNIT-IV : Creating and Managing Named PL/SQL Blocks [20%]

- Creating subprograms (Procedures and Functions) : Subprogram creation, Subprogram parameters, The CALL statement, Procedures versus Functions, Local subprograms and stored subprograms
- Creating Packages: Package specification and package body, Packages and Scope, Overloading packaged subprograms, Package Initialization.
- Database Triggers : Types of triggers, Creating Triggers, Mutating Tables

UNIT-V : Advanced Features in PL/SQL [20%]

- Collections: Declaring and using collection types, Collection in the database, Collection methods
- Language Features: Native dynamic SQL, Bulk binds, Bulk COLLECT and RETURING INTO clause, Object types and Large objects, DBMS_SQL package.

Text Book(s):

1. "SQL,PL/SQL The programming language of oracle", 3rd revised edition, Ivan Bayross, BPB Publication
2. "Oracle 9i PL/SQL Programming", Scott Urman, Oracle Press.

Reference Books:

1. Professional Oracle Programming, by Rick Greenwald, Robert Stackowiak, Gary Dodge, David Klein, Ben Shapiro, Christopher G. Chelliah, Wiley Publication
2. Sams Teach Yourself PL/SQL in 21 Days

3. Oracle9i: The Complete Reference , by Kevin Loney, George Koch , Oracle Press
4. Programming with PL/SQL for beginners, Hiren Dand, Rajendra Patil, Tushar Sambare, SDP

List of practicals based on Designing and implementing

1. Analytical SQL query
2. Simple PL/SQL Blocks
3. PL/SQL Blocks using built-in functions
4. PL/SQL Blocks using cursors
5. PL/SQL Blocks for Error Handling
6. Stored Procedures
7. Functions
8. PL/SQLBlock using Varrays & Nested tables
9. Triggers
10. Packages and usage of in-built packages

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – III)

Subject Name: Advanced Networking – MCA304

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Objectives:

a. To give the understanding of the functionality of each layer of TCP/IP model and interactions between them.
b. To give the understanding of the functionality of UDP and TCP Protocols.
c. To describe the working of routing algorithms and its techniques.
d. To Enhance the knowledge of networking in wireless scope and its security as well.

Learning Outcomes:

At the end of the course, student will be able to:

a. Create a small network - wired as well as wireless
b. Understand the IPv4 and IPv6 addresses
c. Understand the essentials and working of protocols like DHCP, DNS, FTP, TFTP etc.
d. Develop network specific programs

Course Contents:

UNIT – I **Basics of Networking** **[20 %]**

Categories of Networks: Local Area Network, Wide Area Network, Metropolitan Area Networks, Physical Topology: bus topology, ring topology, hybrid topology, OSI Reference Model, TCP/IP Model

Connecting Devices: Physical Media, Switch, Router, Hub, Bridges, Gateway, Repeater

UNIT – II **Internet Protocols & ICMP** **[20%]**

IP Addressing: IP4 and IP6, IP Address, Class full Addressing, Address Resolution Protocols(ARP), Reverse Address Resolution Protocol(RARP), Connectionless Datagram Delivery, Forwarding IP Datagram, Routing table, ICMP protocol, ICMP Message format

UNIT – III **CIDR, UDP and TCP** **[20%]**

CIDR: Subnet Addressing, Subnet mask representation, Classless Addressing
UDP and TCP: UDP Message Format, UDP Pseudo Header, Ports, End Points, Passive and Active opens, Segments, TCP Options, Karn's Algorithm, Congestion, TCP State machine, Silly window syndrome

UNIT – IV **VPN, DNS and TCP protocols** **[20%]**

Virtual Private Network (VPN), Domain Name System (DNS), Name to IP Address Mapping and vice-versa, World Wide Web(WWW) Service, BOOTP, Dynamic Host Configuration Protocol(DHCP), Lease Mechanism, Planning, DHCP Environment, DHCP State machine, TELNET, FTP Services, TFTP, Simple Mail Transfer Protocol (SMTP), POP3, Internet Message Access Protocol (IMAP), Multipurpose Internet Mail Extensions (MIME), Mobile IP

UNIT – V **Internet security** **[20%]**

Introduction to IPsec and SSL, Need for Security, IPSec, Authentication Header (AH), Security Association (SA), Encapsulating Security Payload (ESP), Authentication and mutable header fields, Tunneling, Required security algorithms, Secure Sockets (SSL and TLS), Firewalls, Firewall implementation issues, Packet filtering, Stateful firewalls, proxy servers, Monitoring and logging

Text Book(s):

1. Behrouz A. Forouzan, “Data Communications and Networking”, Tata McGraw-Hill, Fourth Edition
2. Internetworking with TCP/IP Vol.1: Principles, Protocols, and Architecture (5th Edition) by Douglas E. Comer, Prentice Hall

Other Reference Books:

1. Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Prentice Hall.
2. TCP/IP Protocol Suite forth Edition, TMH, Behrouz A. Forouzan
3. TCP/IP Illustrated volume -1 Second Edition The Protocols by kevin R. Fall and W Richard Stevens. Pearson Pub.
4. CCIE Professional development, Routing TCP/IP Vol. 1 second edition Cisco publication Jeff doyle, jenifer Carroll.

Practical List:

Sr.	Definition	
1.	To implement TCP Socket, with two-way communication only once (Non-GUI).	
2.	A program to implement simple UDP Client and Server.	
3.	Write a client / server socket program in which the server echoes the message sent by the client. (Non-GUI).	
4	Server returns the current date and time to the client. (Non-GUI).	
5	A java program in which server computes the factorial of the number, given by the client. (Non-GUI). (Can be extended to all the logics of earlier programming languages like C and C++).	
6	A program to implement the concept of chatting between the two clients.	
7	A program to implement the Inet-Address. Give the IP-Address in command line.	
8	A Non-GUI program to send different "Quote of the Day" to every client when connected.	
9	A program running server socket to validate the user and password information given by the client at command line.	
10	A java routine to implement the concept of Broadcasting.	
11	A java routine to implement the concept of Multicasting.	
12	A java routine to implement the concept of Single Client connects to one server available from multiple servers using multi-threading.	
13	A Non-GUI based program to implement the FTP (File Transfer Protocol). Filename given by command-line, should be transferred to the Server's machine.	
14	A Non-GUI program to implement TELNET. You first login then give the commands which you have decided. According to the commands, desired output should be available on the client's screen.	Implement Dir, Date, Time, Hello, Exit commands.
15	Non-GUI program to implement ARP (Address Resolution Protocol) (means ping facility). Give IP address from client side and check the existence of the server at given IP address. If server exists, then give positive reply otherwise after some time; raise error of time out (Four times).	
16	A GUI-based program to implement DNS (Domain Name Services). Server keeps track on all available clients and their addresses (Name with IP: port). When Client gives a request for other client using name, Server checks the existence of the same and if available, connects both the clients or just replies with intended client's IP address and Port.	
17	A program to implement HTTP server's GET method.	

Note: Perform all the above practical using Java Socket Programming without use of IDEs.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – III)

Subject Name: Optimization Techniques – MCA305

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	-	25	25	50	-	100

Course Description: Optimization Technique includes various Operations Research techniques used for optimization in business, economy, industry, resource allocation, etc. Optimization technique is the study of scientific quantitative decision making methods used to solve real life optimization problems.

Objectives:

1. The course is intended to provide basic understanding of Operation Research Techniques of strategic decision planning for optimum utilization of constraint resources in various span of human life *viz.* industry, business, commerce, administration, management, service supply, maintenance, agriculture, medicines and healthcare, defense etc.
2. The students will learn purpose, importance and applications of optimization techniques of Operation Research and will be able to design and construct suitable optimization models to solve real life strategic problems – issues.
3. It is expected to emphasis on the algorithmic approach rather than on theoretical side.

Mathematical algorithms and derivations are not included for any topic identified. The students are required to use tools like Matlab, Scileab, MS Excel, Mini Tab to implement and apply various optimization techniques.

Course Contents:

UNIT – I: Basics of Operations Research and Linear Programming [20%]

Basics of Operation Research: Operation Research introduction, definitions, features, advantages and applications

Linear Programming Problem (L.P.P.): Linear Programming Problem (L.P.P.), Mathematical definition of a L.P.P. with its components: objective function and constraints, optimal solution, slack, surplus and artificial variables, Graphic method, Simplex method, Big – M method, Primal & Dual problem definition

UNIT – II: Special Cases of Linear Programming Problem [20%]

Transportation problem (T.P.): Mathematical definition of a T.P., Method to find initial basic feasible solution, North-West corner rule, Least cost cell entry method, Vogel's approximation method, Test of optimality for finding an optimum solution – Modi method, Variation in transportation

problem: Unbalanced Supply and Demand, Degeneracy and its resolution, Alternative Optimal Solution (Exclude: Prohibited transportation routes)

Assignment problem (A.P.): Mathematical definition of an Assignment Problem, Method to find an optimum solution - Hungarian Method, Variations of the Assignment Problem: Multiple optimal solutions, Maximization case, Unbalanced Assignment Problem, Restrictions on Assignments

UNIT – III Theory of Games and Queues [20%]

Theory of Games: Introduction, Two – Person Zero Sum game, Pure strategies (Minimax & Maximin principles) Games with saddle point, Rules to determine saddle point.

Theory of Queues: Introduction, Queuing system and problem, transient and steady states, traffic intensity, probability distributions in queuing systems, single service queuing model.

UNIT – IV: Management of Inventory and Replacement [20%]

Management of Inventory: Introduction and terminology of the inventory management, Single Item Inventory Control Models without Shortages, Model –I : EOQ model with constant rate of demand Model – II : EOQ model with different rate of demand.

Management of Replacement: Definition, replacement of items that deteriorates, replacement of item that fails completely.

UNIT – V: Project Management and Scheduling [20%]

Project Management (CPM & PERT): Network concepts, components, rules for network construction, critical path method (CPM) and Project evaluation and Review Techniques (PERT)

Production scheduling (job sequencing): Introduction, Johnson's algorithm for n jobs 2 machines, Johnson's algorithm for N jobs m machines, 2 jobs m machines using graphical method.

Text Book(s):

1. J. K. Sharma, "Operations Research – Theory and Application", 4th Edition, Macmillan Publishers India Ltd.

Other Reference Books:

1. Kanti Swarup, Gupta P.K. , Man Mohan, "Operations Research", Sultan Chand & Sons, New Delhi
2. Shah, Gor, Soni, "Oper ations Research", PHI
3. V. K. Kapur, "Operations Research – Problems & Solutions", Sultan Chand & Sons, New Delhi

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – III)

Subject Name: Mini Project – I MCA306

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
1	1*	2	0	100	0	0	100

Rationale (Course Objective) :

The students would be developing an application on Desktop Publishing, Film Making, HTML Website Designing, 3D animation, Small Project with business aspects (Retail, Import Export, HR, etc) utilizing relevant programming development environment / software development environment. The domain of the project can include case study analysis, near to industry projects / research projects etc.

Learning Outcome:

At the end of the project students will be able to understand the importance of Logic building and programming, which would be of great help in developing a near to real life project in the later semesters.

Instructional Strategies:

Theory sessions for mini project -1 would acquaint students with the basic concepts of developing a project utilizing the concepts of software engineering and object oriented design (including UML). Practical sessions allotted for mini project -1 would ensure that the students undergo sincere work under the guidance of faculty members.

Criteria for Evaluation of Software Projects

Project Definition : 10%

Related project Study Analysis : 30 %

Design& Development : 40%

Implementation & Testing : 20%

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – IV) (W.E.F. Jan 2017)

Subject Name: Object Oriented Technology - II (Adv Java)– MCA401

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
4	3	2	25	25	50	50	150

Rationale (Course Objective) :

The objective of this course to teach the concept of J2EE so they can easily development the application using Servlet, JSP , JDBC and other concept. Instruction shall be in a laboratory setting with continuous hands-on implementation of concepts and emphasis on developing application in AJP.

Learning Outcome:

Students will be able to develop the database driven enterprise application using the concept of AJP.

Instructional Strategies:

- Generally lecture method will be adapted.
- Teaching aids such as OHP and LCD projectors will be used.
- Project based teaching methodology
- Emphasis on self study will be handled through seminars.

Unit 1 SWING COMPONENTS (20%)

Overview of Swing Components, Text and Images in window, Text Fields and Event Handling, Event Types and Listeners, JButton, JCheckBox, JRadioButton, JComboBox, JList, Multiple Selection Lists, Mouse Event Handling, Layout Managers, Key Event Handling, JTextArea, JPopMenus, Menus with Frames

Unit 2 SERVLETS (20%)

Building basic servlets, Understanding the Servlet life cycle, Reading form parameters, Using HTTP request headers, Manipulating HTTP status codes and response headers, Redirecting requests, Generating custom JPEG images from servlets, Handling Cookies, Tracking sessions, Difference between browser and server sessions

Unit 3 JSP Fundaments (20 %)

Overview of JSP, Invoking Java code from JSP pages, Classic JSP scripting elements, Predefined JSP variables, Code structure with the page directive, Controlling multithreading behavior , Pages at request time and compile time , Including Files and Applets in JSP pages

Unit 4 JAVA BEANS and MVC Architecture (20%)

Understanding the benefits of beans, Creating beans, Installing bean classes on server, Accessing bean properties, Setting implicit and explicit bean properties, Sharing beans among multiple servlets and JSP pages, Understanding the benefits of MVC, Request Dispatcher to implement MVC, Handling relative URLs, Different display options, Comparing Data Sharing strategies, Collections and Implicit Objects Using EL, Using EL Operators

Unit 5 JSTL and JDBC **(20%)**

The Application Events Framework, Tag Library – Basics; Using JSTL – c:out, c:forEach, c:forTokens, c:if, c:choose, c:set, c:remove, c:import, c:url, c:param, c:redirect and c:catch Tags Overview of JDBC , Understanding of ODBC , JDBC driver types, JDBC-ODBC bridge , Driver Manager , Driver , Connection , Statement , ResultSet, Accessing databases with JDBC, Configuring MS Access, MYSQL and Oracle9i , Creating and Processing HTML Forms

Text Books:

1. Marty Hall, Larry Brown, "Core Servlets and JavaServer Pages Volume – 1", Pearson
2. Java How To Program- Eighth Edition ,Paul Deitel & Harvey Deitel, PHI Publication

Chapter & Topics –

Book 2:-

Unit 1: Chapter 14, 15, 25

Book 1:-

Unit 2: 2, 3,4,5,6,7,8,9
Unit 3: 10,11,12,13
Unit 4: 14, 15
Unit 5: 17, 18, 19

Reference Book:

1. Java Servlet & JSP CookBook , Bruce W. Perry , O'Reilly.
2. J2EE: the complete reference , James Edward Keogh , McGraw-Hill
3. Java database programming bible, John O'Donahue, Wiley

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – IV) (W.E.F. Jan 2017)

Subject Name: Enterprise Resource Planning – MCA402

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	0	25	25	50	0	100

Course Description:
ERP has revolutionized the way corporate treat information today. The subject will provide awareness about the ERP concepts and the technologies, which bridges gap between you, your business associates and customers. The fitting requirements of ERP packages in different industrial domains are also emphasized. It also helps in understanding how companies have implemented ERP successfully.

Course Objectives:
The objective of this course is to expose students to the concepts of Information Systems (MIS & DSS) & Enterprise Resource Planning (ERP) that address the inter-functional comprehensive view of an enterprise. ERP systems integrate the information across the functions of the organization such as accounting, finance, marketing, production, and human resource development. ERP systems also embed the organizational processes leading to process discipline. Having integrated information systems and tightly integrated processes, ERP systems effectively support managerial decision-making. This course is also inclined to provide students with the knowledge of process of MIS development.

Learning out Comes: On completion of this course, students will be able to:

- Understanding Concept of Information System & its categories.
- Understanding process of Decision Making, MIS &DSS.
- Understand ERP's fundamental concepts
- Understand ERP's role in supply chain management in a modern enterprise
- Understand ERP implementation issues and business process reengineering

Pre-requisites:
Information System, System Analysis, System Design, Management Information System

Content:

UNIT – I [20%]

Introduction to Information System **[06 Lectures]**

Concept of a System, Types of System, Control Elements & Characteristics of System, Information System & its categories, Types of End-Users, Role & Significance of MIS & DSS, Differences between Traditional Management & Modern Management.

Introduction of ERP **[06 Lectures]**

Concept of Enterprise, ERP Overview, Integrated information system, The role of Enterprise, Business Modeling, Myths about ERP, Basic ERP Concepts, Intangible benefits of ERP, Justifying ERP investment, Risks of ERP, Benefits of ERP

UNIT – II [20%]

Modules of ERP: Basic modules of ERP Package **[08 Lectures]**

Human Resources Management, Financial Management, Inventory Management, Quality Management, Sales and Distribution

UNIT – III [20%]

ERP related Technology **[04 Lectures]**

Business Intelligence, Data ware housing, Data mining, OLAP, Business Process Reengineering, SCM, CRM, ERP Security

ERP Implementation **[08 Lectures]**

ERP Lifecycle implementation, implementation Methodologies, ERP package selection, Reasons for failure and reasons for success of ERP implementation, Vendors, Consultants and Users.

UNIT – IV [20%]

ERP Market **[08 Lectures]**

SAP AG, People Soft, Baan Company, JD Edwards, Oracle Corporation, QAD and System Software Associates (SSA). Demo of ERP Modules using Open Source ERP Software like Odoo or ERP Next.

UNIT – V [20%]

Cases of ERP and Enterprise Application **[08 Lectures]**

Explore different ERP Case Studies

Study References for ERP Case Studies:

ERP Demystified by Alexis Leon : Appendix B -ERP Case Studies

Enterprise Resource Planning Text & Cases by Rajesh Ray : Section 6 - Case Studies

Total: 48 Lectures

Text Book:

1. Alexis Leon “ERP Demystifies” of TMH, Second Edition
2. Rajesh Ray “ERP text and cases “ of TMH, First Edition

References:

1. Vinod Kumar Garg “Enterprise Resource Planning Concepts and Practice”, Second Ediition of PHI Edition 2008.
2. David L. Olson, “Managerial issues of Enterprise Resource Planning systems” Of TMH Edition 2004.
3. Ellen Mon, Bret Wagner “Concepts in ERP”, Second Edition of Cengage Learning.
4. Ashim Raj Singla “ Enterprise Resource Planning”, of Cengage Learning, First Edition

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – IV) (W.E.F. Jan 2017)

Subject Name: Software Project Management (SPM) – MCA403

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	0	25	25	50	0	100

Course Description: This subject is mainly designed to prepare IT project managers, novice or experienced, with project management skills needed to better manage IT projects. Built along the IT project management lifecycle, this course covers detailed topics of the basic concepts of IT project management, including initiating, planning, controlling, executing, and closing projects. The course also shows how IT projects should be managed, from inception to post implementation review. The students who take this subject will likely improve their management skills and abilities to define the project scope, create a workable project plan, and manage within the budget and schedule.

Course Objectives: The objective of this course is to provide a foundation to prepare students, as future IT project managers, IT engineers, or system architects, to play leading roles in the application and management of e-business system construction.

Upon successful completion of the course, students will be able to:
Understand the job roles of an IT project manager; Recognize the key issues during the IT project management procedures; Describe the best practices in IT project management processes; Build a performing organization and project team; Develop Work Breakdown Structures (WBS); Establish project estimates and project schedules; Create project plans; Manage overall change control; Control project execution processes; Terminate a project with a close-out strategy; Build up the baseline knowledge for further career in IT project management fields.

Pre-requisites:
Information System, System Analysis, System Design, Management Information System

Content:

UNIT – I

Introduction to Software Project Management: [20%]

Introduction, Why is Software Project Management Important?, What is a Project? Software Projects versus Other Types of Project, Concept of Software Project Management, Need for Software Project Management, Steps in Software Project Management, Difference between Traditional Development & Evolutionary Development. CMM & its need

UNIT – II Requirement Specification, Estimation & Scheduling [20%]

Requirements Specification & Management, Software Requirement Specification, Planning for SRS, Process Definition & Tailoring, Process Database, Estimation & Scheduling, Where are Estimates Done, Problems with Over- and Under-Estimates, The Basis for Software Estimating, Software Effort Estimation Techniques, Bottom-up Estimating, The Top-down Approach and Parametric Models, Process Database (PDB), Process Capability Baseline (PCB), Need for PDB & PCB, Body of Knowledge, Process Assets, Effort Estimation, Top-Down & Bottom-Up Approach.

UNIT – III Quality Planning, Defect Estimation & Risk Management [20%]

Approaches to Quality Management, Quality Goal, The Place of Software Quality in Project Planning, The Importance of Software Quality, Defining Software Quality, ISO 9126, Product versus Process Quality Management, Quality Management Systems, Techniques to Help Enhance Software Quality, Software Reliability, Quality Plans, Defect Estimation, Defect Life Cycle, Risk Management Steps.

UNIT – IV Project Planning, Configuration Management & Life Cycle Execution [20%]

Project Plan Document & its relevance, Configuration Management, Life Cycle Execution Steps, Project Monitoring, and Software Testing & Version Management.

UNIT – V Peer Review, Project Monitoring & Control, Project Closure [20%]

Peer Review, Group Review, Project Monitoring, Tracking & Control, Steps in Project Closure, Closure Analysis, Need & Advantages of Project Closure, Non Compliance Report & its significance.

Text Book:

1. CMM in Practice by Pankaj Jalote

Chapter & Topics – Chapter 1 to Chapter 15 (Full) + Appendix – Complete Book

References:

1. S A Kelkar "Software Project Management A Concise Study", Third Edition, PHI Learning, 2013.
2. Kathy Schwalbe “Project Management in IT”, Indian Edition, Cengage Learning, 2009.
3. Teresa Luckey, Joseph Phillips “Software Project Management for DUMMIES”, Wiley Publishing, Inc., 2006
4. Bob Hughes, Mike Cotterell, Rajib Mall “Software Project Management”, Fifth Edition, Special Indian Edition (SIE), Tata McGraw Hill, 2012.

Kadi Sarva Vishwavidyalaya, Gandhinagar

MASTERS OF COMPUTER APPLICATION (MCA)

Year – II (Semester – IV) (W.E.F. Jan 2017)

Subject Name: Mobile Programming with Android (MPA) - MCA-404(A)

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Description: This course is targeted for students who want to start writing mobile applications on Android platforms. Android became a formidable mobile operating system, and this course will provide hands-on learning classes on writing Android applications. We will get started with the basics of Android programming by covering the most recent version of Android and understanding its development framework. We will learn both the fundamentals and the nuts and bolts of Android and have an exciting opportunity to write feature-rich Android applications that may be published in the Android market.

Objectives:

1. To be able to understand the process of developing software for the mobile
2. To be able to create mobile applications on the Android Platform
3. To be able to create mobile applications involving data storage in SQLite database.

Prerequisites: Knowledge of the Core Java Programming, database concepts.

Course Contents:

UNIT – I Introduction to Android **[20%]**

- History of Mobile Software Development
- The Open Handset Alliance
- The Android Platform Android SDK
- Building a sample Android application
- Anatomy of Android applications
- Android terminologies

UNIT – II Android Application Design Essentials **[20%]**

- Application Context, Activities, Services, Intents
- Receiving and Broadcasting Intents
- Android Manifest File and its common settings
- Using Intent Filter, Permissions
- Managing Application resources in a hierarchy
- Working with different types of resources

UNIT – III Android User Interface Design Essentials **[20%]**

- User Interface Screen elements
- Designing User Interfaces with Layouts
- Drawing and Working with Animation

UNIT – IV Using Android APIs - 1 **[20%]**

- Using Android Data and Storage APIs
- Managing data using SQLite
- Sharing Data between Applications with Content Providers

UNIT – V Using Android APIs – 2 **[20%]**

- Using Android Networking APIs
- Using Android Web APIs
- Using Android Telephony APIs
- Deploying (selling) your Android application

Text Book(s):

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", 2nd edition, Pearson Education

Reference Books:

1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd
2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
3. Sayed Y Hashimi and Satya Komatineni, "Pro Android", Wiley India Pvt Ltd

Unit wise coverage from Text book(s):

1. Unit 1: Chapter 1, 3, 4
2. Unit 2: Chapter 5, 6
3. Unit 3: Chapter 7, 8, 9
4. Unit 4: Chapter 10, 11
5. Unit 5: Chapter 12, 13, 16, 29

Practical List (Mobile Programming with Android (MPA) - MCA-404A)

1. Create "Hello World" application. That will display "Hello World" in the middle of the screen in the red color with white background.
   To understand Activity, Intent
   a. Create sample application with login module.(Check username and password)
   b. On successful login, go to next screen. And on failing login, alert user using Toast.
   c. Also pass username to next screen.
2. Create login application where you will have to validate EmailID (UserName). Till the username and password is not validated, login button should remain disabled.
3. Create and Login application as above. On successful login , open browser with any URL.
4. Create an application that will pass some number to the next screen , and on the next screen that number of items should be display in the list.
5. Understand resource folders :

a. Create spinner with strings taken from resource folder(res >> value folder).
b. On changing spinner value, change image.

6. Understand Menu option.
   a. Create an application that will change color of the screen, based on selected options from the menu.
7. Create an application that will display toast(Message) on specific interval of time.
8. Create an background application that will open activity on specific time.
9. Create an application that will have spinner with list of animation names. On selecting animation name, that animation should affect on the images displayed below.
10. Understanding of UI :
    a. Create an UI such that, one screen have list of all the types of cars.
    b. On selecting of any car name, next screen should show Car details like : name , launched date, company name, images(using gallery) if available, show different colors in which it is available.
12. Understanding content providers and permissions:
    a. Read phonebook contacts using content providers and display in list.
13. Read messages from the mobile and display it on the screen.
14. Create an application to call specific entered number by user in the EditText
15. Create an application that will create database with table of User credential.
16. Create an application that will play a media file from the memory card.
17. Create an application to make Insert, update, Delete and retrieve operation on the database.
18. Create an application to read file from the sdcard and display that file content to the screen.
19. Create an application to draw line on the screen as user drag his finger.
20. Create an application to send message between two emulators.
21. Create an application to take picture using native application.
22. Create an application to pick up any image from the native application gallery and display it on the screen.
23. Create an application to open any URL inside the application and clicking on any link from that URl should not open Native browser but that URL should open the same screen.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – IV) (W.E.F. Jan 2017)

Subject Name: Database Administration (DBA) – MCA404 (B)

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Learning Objectives:

- To introduce the basics of Database Administration.
- To give a detailed understanding of how to maintain a database quickly & accurately.
- The students will be able to design and manage the Database Server to solve the issues related to the Database Server.

Prerequisites:

- Knowledge of DBMS.
- Knowledge of SQL & PL/SQL is desirable.

Detailed Syllabus

Unit 1 **Oracle Overview and Architecture:** 20%

An overview of databases and instances

- Components of an Oracle database and detailed architecture
- Oracle Logical Storage Structures (Table spaces, Blocks, Extents, segments)
- Oracle Physical Storage Structures(Data files, Redo Log files, Control Files, Archived Log Files, Backup Files, Oracle Managed Files, Password Files)
- Oracle memory structures (System Global Area, Program Global Area, Software Code Area, Oracle background processes)

Software Installation

- Overview of Licensing and Installation Options
- Using OUI to Install the Oracle Software
- Using the DBCA to Create a Database
- Manually Creating a Database

Unit 2 **User Administration and Security** 20%

- Non-database Security
- Create and manage database user accounts
- Assign default storage areas (tablespaces)
- Grant and revoke privileges
- Database Authentication Methods(Database Authentication, Database Administrator Authentication, Operating System Authentication,
- Network Authentication, 3-tier Authentication, Client-Side Authentication,
- Oracle Identity Management, User Accounts)

- Database Authorization Methods(Profile Management, System Privileges,
- Object Privileges, Creating, Assigning, and Maintaining Roles)

Unit 3 Backup & Recovery in Database 20%

- Database backup,Recovery Concepts
- Recovery Techniques Based on Deferred Update
- Recovery Techniques Based on Immediate Update
- Shadow Paging
- The ARIES Recovery Algorithm
- Recovery in Multidatabase Systems
- Database Backup and Recovery from Catastrophic Failures

Unit 4 Database Tuning 20%

- Brief overview of tuning methodology, General tuning concepts
- Tuning Application Design(Effective Table Design, Distribution of CPU requirements, Effective Application Design)
- Tuning SQL(Impact of Order on Load Rates, Additional Indexing Options, Generating Explain Plans)
- Tuning Memory Usage(Specifying the Size of the SGA, Using the Cost-Based Optimizer)
- Tuning Data Access(Locally Managed Tablespaces, Identifying Chained Rows, Increasing the Oracle Block Size, Using Index-Organized Tables)
- Tuning Physical Storage(Using Raw Devices)

Unit 5 Indexing Structures for Files 20%

- Types of Single Level Ordered Indexes (Primary Index, Cluster Index, Secondary Index)
- Multilevel Indexes
- Dynamic Multilevel Indexes Using B-Tress and B+-Tress
- Indexes on Multiple Keys
- Other Types of Indexes

Text Books:

1. Kevin Loney, Bob Bryla, "Oracle 10g, DBA Handbook", Oracle Press, TMGH Publications
2. Ramesh Elmasari, Shamkant B. Navathe, "Fundamentals of Database Systems", Pearson Education, 5th Edition

Reference Books:

1. Oracle 10g/11g Administration in Simple Steps by Dreamtech
2. Oracle Administration & Management by Wiley
3. Oracle Applications DBA Field Guide by Apress
4. MySQL Cookbook by O'reilly
5. MySQL Database Design & Tuning by MySQL Press
6. MySQL in a Nutshell by O'reilly
7. SQL Server 2000 Administration Study Guide by Rick Sawtell, Lance Mortensen, Joseph L. Jorden

Chapter wise Coverage from Text book(s):

Book #	Unit#	Contents
1	Unit I	Chp. 1(Pgs. 4-29, 32-36, 47-68)
	Unit II	Chp. 10(Pgs. 325-351)
	Unit IV	Chp. 8(Pgs. 280-297,303)
2	Unit III	Chp. 19(Full)
	Unit V	Chp. 14(Full)

Practical List (Database Administration (DBA) – MCA404B)

1. Installation of Software
2. Create database manually using server manager utility.
3. Create database using Oracle Configuration Assistant
4. Predefined Administrative Accounts
   Predefined Non-Administrative User Accounts
   Predefined Sample Schema User Accounts
   Create User, Roles, Grant different objects and system privileges to users. Grant different roles to users.
5. Managing Table space
   - Creating a Table space
   - Modifying a Table space
   - Dropping a Table space
   - Reclaiming Unused Space
6. Add, Move, and Resize, Datafiles in different table spaces.
7. Managing Rollback Segments
8. Work on different backup & recovery options
9. Work on different Import/Export options.
10. Work of at least 5 tuning options.
    - Use of auto trace
    - Explain plan
    - SQL Tuning Advisory
    - Use Of Indexing

Note:
PROJECT Work OR CASE Study can be given based on other databases like MYSQL, MS-SQL (SQL SERVER), POSTGRES etc. to explore various domain of database systems.

Kadi Sarva Vishwavidyalaya, Gandhinagar

MASTERS OF COMPUTER APPLICATION (MCA)

Year – II (Semester – IV) (W.E.F. Jan 2017)

Subject Name: WIRELESS SENSOR NETWORKS (WSN)- MCA-404(C)

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Description:

The objective of this course is based on understanding Overview, Technology, Protocol and Application of wireless sensor networks (WSN). It **c**overs theoretical as well as applied aspects of wireless sensor networks platform and analyzes a number of working systems (case studies).

Learning Objectives:

Students will learn 5 aspects of WSN in this course, which are as under:

1. They will learn about basic concepts of WSN
2. They will learn concepts of protocols used in WSN.
3. They will learn various strategies used in WSN.
4. They will learn how to implement the TCP protocol in with respect to WSN
5. They will learn different middleware used in WNS, WNS management challenges and models and Operating System environment used.

Prerequisites :

- Knowledge of Wireless networks, Protocols, Transmission Media
- Knowledge of Computer Network Operating Systems

UNIT- I: Overview of Wireless Sensor Networks & Technology

- Basics of wireless sensors network's
- Commercial and Scientific Applications of Wireless Sensor Networks
- Wireless sensors network technology
    a. Sensor Node Technology
    b. WN Operating Environment

UNIT-II Wireless sensors network Protocols

- MAC Protocols for WSNs
    a. Schedule-Based Protocols
    b. Random Access-Based Protocols
- IEEE 802.15.4 LR-WPANs Standard Case Study
    i. PHY Layer

ii. MAC Layer

- Routing Challenges and Design Issues
- Network Scale and Time-Varying Characteristics
- Resource Constraints
- Sensor Applications Data Models

UNIT-III Routing Strategies

- WSN Routing Techniques
- Flooding and Its Variants
- Sensor Protocols for Information via Negotiation
- Low-Energy Adaptive Clustering Hierarchy
- Power-Efficient Gathering in Sensor Information Systems
- Directed Diffusion
- Geographical Routing

UNIT-IV Transport Control Protocols

- CODA (Congestion Detection and Avoidance)
- ESRT (Event-to-Sink Reliable Transport)
- RMST (Reliable Multi-segment Transport)
- PSFQ (Pump Slowly, Fetch Quickly)
- GARUDA
- ATP (Ad Hoc Transport Protocol)
- Problems with Transport Control Protocols

UNIT-V WSN- Middleware, Management and Operating Systems

- Middleware
    a. MiLAN (Middleware Linking Applications and Networks),
    b. Impala
- Management
    a. Network Management Requirements
    b. Network Management Models
    c. Network Management Design Issues
- Operating Systems
    a. TinyOS
    b. Mate

Text Book:

Wireless Sensor Networks Technology, , Protocols and Application by KAZEM SOHRABY, DANIEL MINOLI, TAIEB ZNATI, Wiley

Unit wise coverage from text book(s):

UNIT 1 :	BOOK 1	CH 1 ,2,3 (FULL)
UNIT II	BOOK 1	CH 5 (5.4,5.6) CH 6(6.4)

UNIT III	BOOK 1	CH 6 (6.5)
UNIT IV	BOOK 1	CH 7 (7.3,7.4)
UNIT V	BOOK 1	CH 8 (8.4.1, 8.4.8) CH 9 (9.2, 9.3, 9.4) CH 10(10.3.1,10.3.2)

Practical Programs: To be done in NS-2 or NS-3 simulator. TCL scripts to be used for simulation.

WIRED SCENARIO

1. Write a script in NS to simulate the following scenario –
   A network consists of 3 nodes (Node 0, 1 and 2). The duplex link between node 0 and node 1 has 1 Mbps of bandwidth and 10 ms of delay. The duplex link between node 1 and node 2 has 2Mbps of bandwidth and 10 ms of delay. Each link uses a Drop Tail queue. A "TCP" agent is attached to node 0. "TCPSink" agent is attached to node 2. Both the agents are connected. As default, the maximum size of a packet that a "TCP" agent can generate is 1000bytes. A "TCPSink" agent generates and sends ACK packets to the sender (tcp agent) and frees the received packets. The ftp is set to start at 0.2 sec and stop at 3.0 sec.

2. Write a script in NS to simulate the following scenario –
   A network consists of 5 nodes (Client1, Client2, Router1, Router2 and Endserver1). The duplex links between Client1 Client2 and Router1 have 2 Mbps of bandwidth and 100 ms of delay. The duplex link between Router1 and Router2 has 2Mbps of bandwidth and 100 ms of delay. The duplex link between Router2 and Endserver1 has 200Kbps of bandwidth and 100 ms of delay. Each link uses a Drop Tail queue. A "TCP" agent is attached to Client1, and Client2. "TCPSink" agent is attached to Endserver1. Both the agents are connected. As default, the maximum size of a packet that a "TCP" agent can generate is 1000bytes. A "TCPSink" agent generates and sends ACK packets to the sender (tcp agent) and frees the received packets. The ftp is set to start at 0.5 sec and stop at 5.5 sec.

3. Write a script in NS to simulate the following scenario –
   A network consists of 6 nodes (Client1, Client2, Router1, Router2, Router3 and Server1). The duplex links between Client1 Client2 and Router1 have 3 Mbps of bandwidth and 200 ms of delay. The duplex link between Router1 and Router2 has 2Mbps of bandwidth and 100 ms of delay. The duplex link between Router2 and Server1 has 100Kbps of bandwidth and 300 ms of delay. Each link uses a Drop Tail queue. A "TCP" agent is attached to Client1, and Client2. "TCPSink" agent is attached to Server1. Both the agents are connected. As default, the maximum size of a packet that a "TCP" agent can generate is 2000bytes. A "TCPSink" agent generates and sends ACK packets to the sender (tcp agent) and frees the received packets. The ftp is set to start at 0.3 sec and stop at 4.0 sec.

4. Write a script in NS to simulate the following scenario –
   A network consists of 15 nodes. Create mesh topography. The duplex links between nodes have 10 Mbps of bandwidth and 100 ms of delay. Each link uses a Drop Tail queue. A "TCP" agent is attached to node 0. "TCPSink" agent is attached to Node 14. Both the agents are connected. As default, the maximum size of a packet that a "TCP" agent can generate is 1500bytes. Use CBR application type. The CBR is set to start at 0.2 sec and stop at 8.0 sec.

WIRELESS SCENARIO

5. Write a script in NS to simulate the following wireless scenario –
   A network consists of 4 mobile (wireless) nodes. A TCP connection is setup between the mobile nodes. Packets are exchanged between the nodes. Apply all the wireless scenario parameters.

6. Write a script in NS to simulate the following wireless scenario –
   A network consists of two mobile (wireless) nodes, node 0 and node 1. The mobile nodes move about within an area whose boundary is defined as 500m X 500m. The nodes start out initially at two opposite ends of the boundary. Then they move towards each other in the first half of the simulation and again move away for the second half. A TCP connection is setup between the two mobile nodes. Packets are exchanged between the nodes as they come within hearing range of one another. As they move away, packets start getting dropped.

7. Write a script in NS to simulate the following wireless scenario –
   A network consists of 10 mobile (wireless) nodes. The mobile nodes move about within an area whose boundary is defined as 400m X 400m. 3 nodes move from left to right and 2 nodes move from right to left. Protocol used is AODV. Maximum packet size is 100 bytes. A TCP connection is setup between mobile nodes. Packets are exchanged between the nodes. FTP starts at 0.8 sec and stops at 4.0 sec. Color of node changes to blue at 1.5sec.

8. Write a script in NS to simulate the following wireless scenario –
   A network consists of 20 mobile (wireless) nodes. The mobile nodes move about within an area whose boundary is defined as 600m X 500m. 5 nodes move from bottom to up. Protocol used is DSDV. Maximum packet size is 50 bytes. A TCP connection is setup between mobile nodes. Packets are exchanged between the nodes. FTP starts at 0.6 sec and stops at 5.0 sec. Color of node changes to yellow at 1.5sec.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MASTERS OF COMPUTER APPLICATION (MCA)
Year – II (Semester – IV) (W.E.F. Jan 2017)
Subject Name: Open Source Technology in Web Development (LAMP) – MCA-405(A)

Sub Total Credit	Teaching scheme (per week)		Examination scheme				
			MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Description:

This Course guides the students to – Install MySQL & Apache with PHP, Creating & handling HTML forms, Creating databases and tables and Inserting records in MySQL, Creating custom error handlers, PHP, SQL and MySQL debugging techniques, Setting & accessing cookies & session variables, Upload a file in PHP, Create the advanced PHP scripts needed for a content management site

Objectives:

The purpose of this course is to give students an understanding of Client/Server architecture with their application tools. It deals mainly with client server technologies used in the business as well as web based applications. The course provides an introduction to the development of Web-based applications using PHP, MySQL, and Apache. The course will focus on the PHP programming language. This course also provides how to configure and use different CMS.

Prerequisites:

Working knowledge of Internet and HTML

Course Contents:

UNIT – I: Introduction to PHP: [20%]

Why PHP and MySQL: What is PHP? What is MySQL? Deciding on a Web Application Platform Server- Side Scripting Overview: Static HTML, Client-Side Technology, Server-Side Scripting.
Getting started with PHP: Installing PHP, Escaping from HTML
Learning PHP Syntax and Variables: PHP's Syntax, Comments, Variables, Types in PHP, Output

UNIT – II Control Structures, Arrays and Functions: [20%]

Boolean Expression, Branching, Looping, Using functions
Passing Information with PHP: HTTP is Stateless; GET and POST Arguments, Formatting Form Variables.
String Handling: Strings in PHP, String Functions
Arrays: Creating, Retrieving and deleting value from array, Multi-dimensional Array, Iteration Number Handing: Numerical Types, Mathematical Operators, Mathematical Functions

UNIT – III MySQL Database Integration and Query Processing and Web Forms: [20%]

Introducing Database and MySQL: What is a Database and why database, PHP supported Database. Integrating PHP and MySQL: Connecting to MySQL, Making MySQL Queries, Fetching Data, Multiple connections, Building in error-checking, Creating MySQL database with PHP, MySQL functions. Performing Database Queries: HTML Tables and Database Tables, Complex Mapping. Integrating Web Forms and Databases: HTML Forms, Basic Form Submission to a Database.

UNIT – IV Advanced PHP: **[20%]**

Introducing Object-Oriented PHP: What is Object-Oriented Programming? Basic PHP Constructs for OOP, Advanced OOP features. Working with Cookies and Sessions: What is a Session? How Session works in PHP, Session Functions, Cookies. Exception with PHP: Error Handling in PHP.

UNIT – V PHP CMS and Framework **[20%]**

WordPress: About WordPress: Why WordPress?, Sites Built with WordPress, Installing and Upgrading WordPress, Dashboard and Settings, Working with Content: Post, Pages, Posts vs. Pages, Media Files, Links, Feeds, Importing Content: Importing Blogs, Importing HTML Files , Creating a Basic Theme.

Codeigniter: Introduction to CodeIgniter, Setting up a CodeIgniter Site, Navigating Your Site, Using CI to Simplify Databases, Simplifying HTML Pages and Forms, Simplifying Sessions and Security.

Text Book(s):

1. PHP6 and MySQL Bible –Steve Suehring, Tim Converse and Joyce Park – Wiley India Edition.
2. Beginning wordpress 3 by Stephanie Leary – APRESS Publication
3. CodeIgniter for Rapid PHP Application Development by David Upton – PACKT Publication

Reference Books:

1. PHP and MySQL Web Development – Luke Welling, Laura Thomson – Pearson

Unit wise coverage from Text book(s) : Unit 1 to 4 from Text Book – 1:
Chapter – 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 15, 16, 17 (Full)
Chapter - 20 (Pg. No: 311 -334)
Chapter - 24 (Pg. No: 409 -427)
Chapter - 30 (Pg. No: 497 – 504)

Practical List (Open Source Technology in Web Development (LAMP) – MCA-405A)

1 Write a program that formats a block of text to be inputted by the user, based on the performances chosen by the user. Give options for color, font and size and display the output.

2 Create a web page and execute a PHP file on submission of the form and display the information using PHP.

3 Create an application that validates the proper email address and turns it into a link.

4 Include the user profile application, where user has to pass all validations.

5 Write a PHP program to perform following string operations:
a) print your name.
b) print the size of a string. Pass string as an argument.
c) concat two strings.
d) convert case of string
f) find one string from another.

6 Write a PHP Program to perform following operation on Array where values in array are entered by user
a) Print the values of array.
b) Reverse an array.
c) merge two arrays in sorted manner.
d) add values of all elements of an array.

7 Write a PHP program to display current date and time and display Good Morning / Good Afternoon / Good Evening message according to current time.

8 Create an application to create a cookie, access a cookie and destroy the cookie.

9 Set a session after user's login; maintain the user's data with session. Destroy the session and its data after a period of time.

10 Build an authentication application and restricts the unauthorized user from loading the page. And redirect the page with appropriate message.

11 Develop an application which stores student's info with following fields rno, name, city, gender, percentage. Provide the following facilities like:
a. Search by city
b. Search by Gender
c. Display max and min percentage.

12 Write a program to calculate total weekly pay. If the user enters the number of hours worked and selects the hourly rate of pay from a list box. If overtime has been done, the number of hours is also entered. Over time hours are paid at double rate. A check box displays overtime. Calculate total amount to be paid.

13 Develop an application to add the movie name currently running with following operations:
a. To see all the favorite movie
b. To view top 5 and 10movies

14 Create an application which displays the info about a particular institute which enables the user to see the faculty list according to department.

15 Create an application that keeps track of how many times a visitor has loaded the page.

16 Write a program to do the paginating function to allow the user to go to the first page / last page like, <Prev [1] [2] ……. [10] Next>

17 Write a PHP program to calculate interest for loan using user defined class 'loancalculator'.

18 Write a program for online merchants with following operations:
a. Customer login for further transactions
b. Validates the customer's information
c. System should protect customer's information

19 Develop an application for a shopping cart with following operations:
a. Manage and display the catalog
b. Add, Update and delete the products
c. Process the shipping info
d. Stores the order info
e. Display the summary

20 Display the most popular item to your customer which is purchased the most? If the item is in top 5 display the description to the customer.

21 Create a database application for social gathering containing
a. Information about the location (eg: club house, Party venue)
b. Facilities available in the venue
c. Booking for the specific events
d. Display the booking details for current month and also generate the report for the bill to be paid for a particular booking

Kadi Sarva Vishwavidyalaya, Gandhinagar
MASTERS OF COMPUTER APPLICATION (MCA)
Year – II (Semester – IV) (W.E.F. Jan 2017)
Subject Name: Big Data & Data Analytics – MCA-405(B)

Sub Total Credit	Teaching scheme (per week)		Examination scheme				
			MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Description:
This course introduces Big Data and Data Analysis. The course gives fundamental knowledge of data analysis with structured program logic of R-Language. It introduces the basic flow and construction of programming language for given problem. Course includes language syntax, data types, program organization, problem-solving methods, algorithm design, and logic control structures.

Objectives:
More and more organizations these days use their data a decision supporting tool and to build data - intensive products and services. The collection of skills required by organizations to support these functions has been grouped under the term "Data Sciences". This course will cover the basic concepts of big data, methodologies for analyzing structured and unstructured data with emphasis on the relationship between the Data Scientist and the business needs. The course provides a deep - dive into Big Data, Data Analytics, by providing an advanced, practical background that allows the students to lead and participate in Big Data and Data Analytics projects.

Prerequisites: Database Management Systems, Object Oriented Programming, Statistics

Course Contents:

Unit – I – What Is Big Data and Why Does It Matter?
What Is Big Data? - Is the "Big" Part or the "Data" Part More Important? - How Is Big Data Different? - How Is Big Data More of the Same? - Risks of Big Data - Why You Need to Tame Big Data - The Structure of Big Data - Exploring Big Data - Most Big Data Doesn't Matter - Filtering Big Data Effectively - Mixing Big Data with Traditional Data - The Need for Standards - Today's Big Data Is Not Tomorrow's Big Data

Unit – II – Industry Examples of Big Data
Digital Marketing and the Non-line World - Database Marketers, Pioneers of Big Data - Big Data and the New School of Marketing - Fraud and Big Data - Risk and Big Data - Credit Risk Management - Big Data and Algorithmic Trading - Big Data and Advances in Health Care - Pioneering New Frontiers in Medicine - Advertising and Big Data: From Papyrus to Seeing Somebody - Using Consumer Products as a Doorway -

Unit – III – Business Analytics
The Last Mile in Data Analysis - Geospatial Intelligence Will Make Your Life Better - Listening: Is It Signal or Noise? - Consumption of Analytics - From Creation to Consumption - Visualizing: How to Make It Consumable? - Organizations Are Using Data Visualization as a Way to Take Immediate Action - Moving from Sampling to Using All the Data - Thinking Outside the Box - 360° Modeling - Need for Speed - Let's Get Scrappy - What Technology Is Available? - Moving from Beyond the Tools to Analytic Applications

UNIT – IV – Basic of R

A few concepts before starting

How R works - Creating, listing and deleting the objects in memory - The on-line help

Data with R

Objects - Reading data in a file - Saving data - Generating data - Manipulating objects

Graphics with R

Managing graphics - Graphical functions - Low-level plotting commands - Graphical parameters - A practical example - The grid and lattice packages

UNIT – V – Programming with R

Statistical analyses with R

A simple example of analysis of variance - Formulae - Generic functions - Packages

Programming with R in Practice

Loops and vectorization - Writing a program in R - Writing your own functions

Textbook for the Subject:

1. Taming The Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics Bill Franks ISBN: 978-1-118-20878-6, March 2012
2. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses Michael Minelli, Michele Chambers, Ambiga Dhiraj, ISBN: 978-1-118-14760-3, January 2013
3. R for Beginners, Emmanuel Paradis

Chapter wise Book coverage:

Unit – I – Chapter 1 - What Is Big Data and Why Does It Matter?
Taming The Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics Bill Franks ISBN: 978-1-118-20878-6, March 2012

Unit – II – Chapter 2 - Industry Examples of Big Data
Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses Michael Minelli, Michele Chambers, Ambiga Dhiraj, ISBN: 978-1-118-14760-3, January 2013

Unit – III - Chapter 5 Business Analytics
Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses Michael Minelli, Michele Chambers, Ambiga Dhiraj ISBN: 978-1-118-14760-3, January 2013

Unit – IV – Chapter 2, 3, 4
R for Beginners, Emmanuel Paradis,
http://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf

Unit – V – Chapter 5, 6
R for Beginners, Emmanuel Paradis,
http://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf

Practical Programs:

1. Create two excel file which store the details of the employees personal details, official details, based on the joining details of the employee and the increment given predict list of employee whether promotion can be given or not.
2. Create an excel file to store the details of the patients health details,
    a. Predict whether the user is health or not based on the health reports.
    b. Prediction should be done based on the normal values [i.e: BMI, weight, BP, Cholestrol etc]
3. Read two matrixes and perform all the matrix operations like addition, subtraction, multiplication, division, transpose. Assign name for the rows and columns
4. Create multiple vector, read all the vectors, store in a data frame and perform all the operations and conditions based on the vector.
    a. Assign new name to the data frame
    b. Attach the new column
    c. Print the output in the new column based on some conditions
5. Create an excel file which contains the sale details of 3 years in a particular industry.
    a. Represent the details in the form of histogram, barplot, boxplot
6. Create an excel file which stores the result details of the students of MCA. Predict the next year result based on the criteria like [Theory assignment, Practical assignment, Class performance, attendance, etc]. Plot the scatter plot of the performance of the students.
7. Write the R code which store the player information like Name, Team, No of times has played, No of goals scored till date.
    a. Store the details in the .csv file
    b. Display the details of a single player by entering the name
    c. Display the full details of a player who has secured maximum score.
    d. Display the average score of each team.
    e. Update the score of a particular team and store the details in .csv through R

8. Write the R code to store the student's examination details like roll_no, name, semester, sub1_marks, sub2_marks etc.
    a. Displays the detailed mark sheet of particular student by passing the roll_no.
    b. Display the list of students who has cleared in all subjects
    c. Calculate the total number of failed students
    d. Display the total number of students who has secured more than 60%
    e. Display the full details of a student who has secured maximum marks.
9. Perform the list of operations for the following:
    a. List the objects in memory.
    b. Clear the screen.
    c. Declare variables x, y and assign values of 5 and 8 to x and y.
    d. Perform simple calculations like addition, subtraction, division, multiplication etc. on x and y.
    e. Print the values of variables on screen.
    f. Assign five distinct values to z.
    g. Assign sequential value from 1 to 20 to t.
    h. Declare an array a.
    i. Input multiple values from the user at prompt and store it in c.
    j. Show the data types of all objects on screen.
    k. Sort the values in descending order.
    l. Find out the sum, max, min, diagonal element of matrix.
    m. Find out the working directory and change it.
    n. Remove x and y objects from memory.
    o. Print only odd numbers of series.

10. Create a matrix of 3 x 3 and make layout, and print the data in the layout.
11. Generate a graphical image by using all plot, define the title, x-axis, y-axis, x limit and y-limit of a graph for a .csv file?
12. Retrieve the data from the .csv file
    a. Normalize the data
    b. Represent in a graphical form
    c. Specify x-axis, y-axis, x-limit, y-limit, include color to the graph, change the plot style
13. Use the lattice library and display the graphical image of all lattice form
14. Generate the .csv file, create different models and specify the
    a. Summary of different models
    b. Find the residual, co-efficient, fitted and AIC.
15. Write a R function to calculate the Fibonacci series.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MASTERS OF COMPUTER APPLICATION (MCA)
Year – II (Semester – IV) (W.E.F. Jan 2017)
Subject Name: Network Security (NS) – MCA-405(C)

Sub Total Credit	Teaching scheme (per week)		Examination scheme				
			MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Objectives:

- To give the understanding of the different type of security mechanism performed in Internet.
- To describe mechanism of firewall and Intruders
- To give the understanding of the functionality symmetric and asymmetric Encryption Method.
- To describe the working of routing algorithms and its techniques.

Learning Outcomes:

At the end of the course, student will be able to:

- Describe and analyze the software, components of a network and the interrelations.
- Explain networking protocols and their hierarchical relationship.
- Compare protocol models and select appropriate protocols for a particular design.

Course Contents:

UNIT – I **Network Security and Symmetric Encryption** **[20 %]**

Security Trends, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanism, A Model for Internetwork Security, Internet Standards the Internet Society, Symmetric Encryption Principles, Symmetric Block Encryption Algorithms, Stream Ciphers and RC4, Cipher Block Modes of Operation

UNIT – II **Asymmetric key Encryption Techniques** **[20%]**

Location of Encryption Devices, Approaches to Message Authentication, Secure Hash Functions, Message Authentication Codes, Public-Key Cryptography Principles, Public-Key Cryptography Algorithms, Digital Signatures

UNIT – III **Authetication Mechanism and Virus Protection** **[20%]**

Key Management. Kerberos, X.509 Directory Authentication Service, Public Key Infrastructure, Malicious Software: Types of Malicious Software, Viruses, Virus Countermeasures, Worms, Distributed Denial of Service Attacks

UNIT – IV **Web Security and Intrusion** **[20%]**

Web Security Considerations, Secure Sockets Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Intrusion Detection.

UNIT – V **Passwords and Firewalls** **[20%]**

Password Management. Firewall Design Principles, Trusted Systems, Common Criteria for Information Technology Security Evaluation.

Text Book(s):

1. William Stallings, "Network Security Essentials: Applications and Standards", 3rd Edition, Pearson Education
2. "Computer Networks" by Andrew Tanenbaum, Pearson Education

Other Reference Books:

1. Behrouz Forouzan, "Cryptography and Network Security", TMH Publication.
2. Nina Godbole, "Information Systems Security", Wiley Publication.
3. William Stallings, "Cryptography and Network Security", Pearson Education

Unit wise coverage from above Text books:

Unit No.	Chapter	Description
Unit - I	Chapter – 1	All
	Chapter – 2	All
Unit – II	Chapter – 3	All
Unit – III	Chapter – 4	All
	Chapter – 10	All
Unit – IV	Chapter – 5	All
Unit –V	Chapter – 9	All
	Chapter – 11	All

Practical Programs

Note: - Develop a JAVA program to simulate a Client – Server scenario fulfilling the following conditions

Practical Number	Practical List
1	Sender/Recvr Program that converts decimal data into binary and vice versa.
2	Sender/Recvr Program appends the total count of characters in the string.
3	Sender/Recvr Program that performs byte stuffing in the data.
4	Sender/Recvr Program that performs character stuffing in the data.
5	Sender/Recvr Program to implement VRC method.
6	Sender/Recvr Program to implement LRC method.
7	Sender/Recvr Program to implement Checksum method.
8	Sender/Recvr Program to implement CRC method.

9	Sender/Recvr Program to implement Mono Alphabetic Substitution Method
10	Sender/Recvr Program to implement Caesar Method
11	Sender/Recvr Program to implement Transposition Method
12	Sender/Recvr Program to implement One time Pad Method
13	Sender/Recvr Program to implement RSA Method
14	Program to implement P-box
15	Program to implement S-box
16	Write a program of DES with Cipher Block Chaining mode.
17	Write a program of DES with Cipher Feedback mode
18	Write a program of DES with Electronic Codebook mode
19	Write a program of DES with Output Feedback mode.
20	X.509 Certificate creation

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – IV) (W.E.F. Jan 2017)

Subject Name: Mobile Cross Platform Development Using PhoneGap - MCA-406(A)

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	0	25	25	50	0	100

Course Description:
PhoneGap is a growing and leading open-source mobile web apps development framework that lets developers build JavaScript and HTML5-based web applications with native wrappers for more than six mobile platforms, including iOS, Android, and BlackBerry.

This framework lets you build HTML- and JavaScript-based apps and still take advantage of native mobile device capabilities like camera, localStorage, geolocation, storage and much more, irrespective of the mobile platform you target. It also lets you use more specialized JavaScript frameworks like jQuery Mobile and more.

Course Objectives:
PhoneGap teaches the fundamentals and strategies behind cross-platform mobile application development. Instead of learning languages like Objective-C, focus on building apps from day one for Android, iOS, WebOS - without the complexities of these platforms.

Pre-requisites: Knowledge of object oriented programming,basi HTML and database concepts

Detailed Syllabus

Unit 1

- **Introduction to PhoneGap** — 20%
  - A Little PhoneGap History,Why Use PhoneGap?,How PhoneGap Works,Designing for the Container,Writing PhoneGap Applications,Building PhoneGap Applications,PhoneGap Limitations,PhoneGap Plug-Ins,Getting Support for PhoneGap,PhoneGap Resources,Hybrid Application Frameworks
- PhoneGap Development, Testing, and Debugging
  - Hello, World!,PhoneGap Initialization,Leveraging PhoneGap APIs,Enhancing the User Interface of a PhoneGap Application,Testing and Debugging PhoneGap Applications,Dealing with Cross-Platform Development Issues,API Consistency

Unit 2

- **PhoneGap Developer Tools** — 20%
- Configuring an Android Development Environment for PhoneGap
  - Installing the Android SDK,Eclipse Development Environment Configuration,Creating an Android PhoneGap Project,Testing Android PhoneGap Applications
- Configuring a Windows Phone Development Environment for PhoneGap

- Installing the Windows Phone Development Tools,Creating a Windows Phone PhoneGap Project,Testing Windows Phone PhoneGap Applications

- Using PhoneGap Build
  - The Fit,Getting Started,Configuration,Creating an Application for PhoneGap Build,Creating a PhoneGap Build Project,Dealing with Build Issues,Testing Applications,Debug Mode

Unit 3 • **PhoneGap APIs –1** 20%

- Accelerometer
  - Querying Device Orientation,Watching a Device's Orientation
- Contacts
  - Creating a Contact,Searching for Contacts,Cloning Contacts,Removing Contacts
- DEVICE, THE NETWORK, AND NOTIFICATIONS

Unit 4 • **PhoneGap APIs –2** 20%

- Events
  - Creating an Event Listener,deviceready Event,Application Status Events, Events,Button Events
- File
  - Available Storage Types,Accessing the Device's File System,Reading Directory Entries,Accessing FileEntry and DirectoryEntry Properties,Reading/Writing Files,Deleting/Copying/Moving Files and Directories,Uploading Files to a Server

Unit 5 • **PhoneGap APIs –3** 20%

- Media
  - The Media Object,Playing Audio Files,Recording Audio Files,Seeing Media in Action
- Storage
  - Local Storage,SQL Database

Text Book :

1. "Beginning PhoneGap,Mobile Web Framework for JavaScript and HTML5"
   Publisher: Apress
   By: Rohit Ghatol, Yogesh Patel

Reference Books :

1. PhoneGap 2.x Mobile Application Development
2. PhoneGap Mobile Application Development Cookbook
3. 20 Recipes for Programming PhoneGap, Building Mobile Applications with Java

Unit wise coverage from Text Book

1. Unit 1: Chapter -1,2
2. Unit 2: Chapter-3
3. Unit 3: Chapter-5,6,13
4. Unit 4: Chapter 4,12
5. Unit 5: Chapter – 9,1

MASTERS OF COMPUTER APPLICATION (MCA)

Year – II (Semester – IV) (W.E.F. Jan 2017)

Subject: DISTRIBUTED DATABASES (DD) - MCA-406(B)

Sub Total Credit	Teaching scheme (per week)		Examination scheme				
			MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	0	25	25	50	0	100

Course Description:

The objective of this course is based on Design, Architecture, Query Optimization, Transaction Management and Concurrency control aspects of Distributed Database Management Systems (DDBMS). It **c**overs theoretical as well as applied aspects of distributed platform and analyzes a number of working systems (case studies) and discusses the future infrastructure.

Learning Objectives:

Students will learn Five aspect of DDBMS in this course, which is as under:

- In "**Introduction to DDBMS**" they will learn about basic concepts of DDBMS
- In "**DDBMS Architecture** " they will learn architectural components of DDBMS
- In "**Distributed Database Design**" they will learn various design concepts to develop DDBMS.
- In "**Query Optimization**" they will learn how to optimize the data retrieval using various algorithms
- In "**Transaction Management and Concurrency Control in DDBMS**" they will learn how to manage transaction and deal with concurrency problems in DDBMS.

Prerequisites :

- Knowledge of database management system concepts
- Knowledge of Computer Networks concepts

UNIT-I : Introduction to DDBMS **[20%]**

- Distributed Data Processing
- Defining Distributed Database System
- Promises of DDBMS
- Complicating Factors
- Problem Areas

UNIT-II : DDBMS Architecture **[20%]**

- Architectural Models for Distributed DBMSs: Autonomy, Distribution and Heterogeneity.
- Architectural alternatives
- Client/Server Systems
- Peer-to-Peer Distributed System
- Multi-DBMS Architecture (MDBS)

UNIT-III : Distributed Database Design **[20%]**

- Alternative Design Strategies
- Distribution design issues
- Fragmentation
- Allocation

UNIT-IV : Query Optimization **[20%]**

- Defining Query Optimization
- Centralized Query Optimization
- Join Ordering in fragment queries
- Distributed query optimization algorithms

UNIT-V : Transaction Management and Concurrency Control in DDBMS **[20%]**

- Types of Transaction
- Serializability
- Locking based Concurrency Control
- Time stamp based Concurrency Control
- Optimistic concurrency control
- Deadlock Management
- "RELEXED" Concurrency Control

Text Book(s):

1. Principles of Distributed Database Systems. Ozsu and Valduriez. Prentice Hall.
2. DISTRIBUTED DATABASE MANAGEMENT SYSTEMS :A Practical Approach, by SAEED K. RAHIMI and FRANK S. HAUG, A JOHN WILEY & SONS, INC., PUBLICATION

Reference Books:

1. Distributed Databases Principles and Systems. Ceri , Pelagatti, MGH 2008
2. Distributed Database System by Chhand Ray , Pearson
3. Modern Database Management by Jeffery Hoffer, Seventh Edition, PEARSON
4. Database Systems Concepts by Abraham, Korth, S. Sudarsan, Fifth Edition, MGH
5. Raghu Rama Krishnan and Johannes Gechrib, "Database Management Systems", Mc Graw Hill.
6. Date C. J, "An Introduction to Database System, Vol1 & II", Addition Wesley.
7. Elmasari , Navathe, "Fundamentals of Data Base Systems", Addition Wesley.
8. RamaKrishnan , Gehke, "Database Management System", McGraw Hill

Unit wise coverage from text book(s): DISTRIBUTED DATABASES (DD) - MCA-406(B)

UNIT 1 : BOOK 1 CH 1 (FULL)
UNIT II BOOK 1 CH 4 (FULL)
UNIT III BOOK 1 CH 5 (FULL)
UNIT IV BOOK 1 CH 9 (FULL)
UNIT V BOOK 1 CH 10 (10.3) CH 11 (FULL)

List of practicals/case studies for class demonstration will be based on (BOOK 2, BOOK1)

2. Designing Distributed databases (BOOK 2 CH 2, ch 3))
   - Database fragmentation strategies (BOOK 2 CH 2)
   - database horizontal / vertical partitioning (BOOK 2 CH 2)
   - data control (BOOK 2 CH 3)
3. Query optimization (BOOK 2 CH 4)
   - Joining multiple tables at different sites

Continuous Evaluation Management(Internal Marks)

The continuous evaluation will be organized as follows:

Project: There will be one research project where each student has to solve a research problem and develop efficient solution. It is emphasize that the research report must be of conference or journal quality. A list of useful projects (unsolved problem) will be presented to the class and students are free to select a topic from this list. A student is free to select a research topic out side of this list but the topic must be related to the course material and must be approved by the subject faculty before students begins his/her research.

Seminar/Presentation: Each student must present a seminar on the topic of their research. They can select the same topic for seminar and research paper. Each seminar will be an hour long and 15 minutes for question and answer and the seminar participation is mandatory for each student of this course. These seminars will be presented near the end of the semester. In case of high enrollment two students may be assigned to a project and seminar. (This can be perform as group activity with limited team member size)

Internal Marks: The final internal marks will be obtained on the basis of the quality of the seminar, participation in the class discussion, and the quality of the research report.

Students are encouraged to join in the class discussion and present their thoughts and ideas on the all distributed system problems.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – IV) (W.E.F. Jan 2017)

Subject Name: Heterogeneous Network - MCA-406(C)

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	0	25	25	50	0	100

Course Objectives:

The objective of this course is based on understanding Overview, Technology, Management and Application of Heterogeneous networks. It **c**overs theoretical as well as applied aspects of Heterogeneous Network and analyzes a number of working systems (case studies).

Pre-requisites:

- Knowledge of Wireless networks, Protocols, Transmission Media
- Knowledge of Computer Network Operating Systems

Detailed Syllabus

Unit-1 Introduction and overview of Heterogeneous Networks **20%**

- Motivations for Heterogeneous Networks
- Definitions of Heterogeneous Networks
- Heterogeneous Networks Use Scenarios
- Aspects of Heterogeneous Network Technology
    - RF Interference
    - Radio System Configuration
    - Network Coupling
    - User and Device Credential
    - Interworking
    - Handover
    - Data Routing
    - Quality of Service
    - Security and Privacy
    - Capacity and Performance Evaluation
- Heterogeneous cellular network nodes
    - Remote radio heads
    - Micro base stations
    - Pico base stations
    - Femoto cell access points
    - Relay nodes
- Introduction to 3GPP LTE advanced heterogeneous cellular networks.

Unit-2 Multi-tier Network Architecture **20%**

- Heterogeneous Network Deployment Scenarios.
    - OSG scenario

    - CSG scenario
- Interference Management
- Multi-radio techniques
- Cross-tier interference
- Deployment Scenarios for LTE-Advanced HetNet
    - Macro-Femto Scenario
    - Macro-Pico Scenario.

Unit-3 Inter-cell interference Management **20%**

- Introduction
- Conventional inter-cell interference Coordination
- Enhanced inter-cell Interference Coordination
- Interference Scenarios

Unit-4 Mobility and handover management **20%**

- Mobility Management in RRC-connected state.
- Mobility Management in RRC-idle state
- Mobility Management in heterogeneous cellular networks.

Unit-5 Cell Selection Modes in Heterogeneous Deployment **20%**

- Distinction of cells
- Access Control
    - Access Control Scenarios
    - Access Control Executor
    - Access Control Mechanism
- Cell Selection and Cell Reselection.
- Cell Reselection in Macro-Femto cells.

Reference Books:

1. Heterogeneous Cellular Networks. – Rose Qing Hu, Yi Qian – Wiley Publication, IEE Press
2. Heterogeneous Cellular Networks – Theory, Simulation and Deployment, By: Xiaoli Chu, David Lopez-Perez, Yang Yang, Fedrik Gunnarsson - Cambridge University Press.
3. Heterogeneous Wireless Access Networks – Ekram Hossain – Springer.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – II (Semester – IV) (W.E.F. Jan 2017)

Subject Name: Mini Project II - MCA-407

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
1	0	2	0	50	0	0	50

Rationale (Course Objective) :

The students would be able to understand the working concept of Networking, Intranet, concept and design of OOAD. Students would be develop an application on working Small Project with business aspects (Retail, Import Export, HR, etc) utilizing relevant programming development environment / software development environment. The domain of the project can include case study analysis, near to industry projects / research projects etc.

Learning Objectives:

In this syllabus, students will learn to apply the Unified Modelling Language (UML) to fundamental object-oriented analysis and design concepts.

Object Oriented Analysis and Design Using UML present the concepts and techniques necessary to effectively use system requirements to drive the development of a robust design model, It includes architecture, objects, classes, components, stereotypes, relationships and all supporting diagrams.

The UML is used throughout the project lifecycle to capture and communicate analysis and design decisions. Students will understand OOAD Concepts, learn to represent it with UML and document it using UML modelling tool. The Session will be concept & Case study driven and wherever necessary tool will be used.

Prerequisites:

Knowledge of any Object Oriented Programming Language and System Development Life Cycle.

Contents:

This course uses the industry-standard Unified Modeling Language (UML) as a means of depicting OO software design and providing team members with a common notation and vocabulary for communicating their ideas. This course will teach students the basic concepts of the object-oriented paradigm using the Unified Modeling Language (UML). Students will be introduced to concepts such as abstraction, polymorphism and encapsulation, and will learn how to use these concepts in object-oriented software development.

Course Content

- **Why We Model?:** The importance of modelling, principles of modelling, Introduction of UML: Overview, Conceptual Model of UML , Classes, Relationships, Common Mechanisms of UML.
- **Class Diagrams:** Terms and Concepts, Common Modeling Techniques, Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages Instances, Object Diagrams, Basic Behavioral Modeling: Interactions, Use cases, Use Case Diagrams, Interaction Diagrams, Activity Diagrams
- **Advanced Behavioral Modelling:** Events and Signals, State Machines, State Diagrams, Architectural Modelling: Components, Deployment, Collaborations, Component Diagrams, Deployment Diagrams,
- **Case Study** Generate Use-case Diagram, Class Diagram, Sequence Diagram, Collaboration Diagram, Activity Diagram, State Chart Diagram, Component Diagram, Deployment Diagram for the following systems.

  - Student Registration System
  - Courier Tracking System
  - Online Shopping System
  - Online Pizza ordering System
  - Online Job Portal System

Total Sessions: 12

Criteria for Evaluation of Software Projects

Project Definition:	10%
Related project Study Analysis:	30 %
Design& Development:	40%
Implementation & Testing:	20%

Notes:

1. **Reference Book(s):**
   The Unified Modeling Language User Guide By Grady Booch, James Rumbaugh, Ivar Jacobson Publisher Pearson Education
2. **Suggested Additional Reading:**
   a. UML 2 Bible by Tom Pender Publisher Wiley-dreamtech
   b. UML 2 and the Unified Process Practical Object-Oriented Analysis and Design Second Edition by Jim Arlow, LLa Neustadt Publisher Pearson Education
   c. Web reference: By Object Management Group (OMG) http://www.uml.org/

UML Diagram Tool:
Dia (diagramming software):
Dia is free and open source general-purpose diagramming software, developed originally by Alexander Larsson. Dia uses a controlled single document interface (SDI) similar to GIMP and Inkscape. It can be downloaded from http://sourceforge.net/projects/dia-installer/?source=typ_redirect

Accomplishment of the student after completing the course:
After successful completion of this course the students will be able to discriminate what the UML is, what it is not, and why the UML is relevant to the process of developing software-intensive systems. They will be master the vocabulary, rules and idioms of the UML and, in general will be able to use the language effectively in System Development process. They will be able to understand how to apply the UML to solve a number of common modelling problems.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MASTERS OF COMPUTER APPLICATION (MCA)
Year – III (Semester – V) (W.E.F. June 2017)
Subject Name: Data Warehousing & Data Mining (DWDM) – MCA-501

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Description: Data warehousing and data mining are two major areas of exploration for knowledge discovery in databases. These topics have gained great relevance especially in the 1990's and early 2000's with web data growing at an exponential rate. As more data is collected by businesses and scientific institutions alike, knowledge exploration techniques are needed to gain useful business intelligence. This course will cover a wide spectrum of industry standard techniques using widely available database and tools packages for knowledge discovery.

Data mining is for relatively unstructured data for which more sophisticated techniques are needed. The course aims to cover powerful data mining techniques including clustering, association rules, and classification. It then teaches high volume data processing mechanisms by building warehouse schemas such as snowflake, and star. OLAP query retrieval techniques are also introduced.

Learning Objectives

- To understand the need of Data Warehouses over Databases, and the difference between usage of operational and historical data repositories.
- To be able to differentiate between RDBMS schemas & Data Warehouse Schemas.
- To understand the concept of Analytical Processing (OLAP) and its similarities & differences with respect to Transaction Processing (OLTP).
- To conceptualize the architecture of a Data Warehouse and the need for pre-processing.
- To understand the need for Data Mining and advantages to the business world. The validating criteria for an outcome to be categorized as Data Mining result will be understood.
- To get a clear idea of various classes of Data Mining techniques, their need, scenarios (situations) and scope of their applicability.
- To learn the algorithms used for various types of Data Mining problems.

Pre-requisites: Knowledge of RDBMS and OLTP

Unit: 1 – Introduction to Data Warehousing, A Multi-dimensional Data Model & Schemas, OLAP Operations & Servers

- An overview and definition along with clear understanding of the four key-words appearing in the definition.
- Differences between Operational Database Systems and Data Warehouses; Difference between OLTP & OLAP
- Overview of Multi-dimensional Data Model, and the basic differentiation between "Fact" and "Dimension"; Multi-dimensional Cube
- Concept Hierarchies of "Dimensions" Parameters: Examples and the advantages

- Star, Snowflakes, and Fact Constellations Schemas for Multi-dimensional Databases
- Measures: Their Categorization and Computation
- Pre-computation of Cubes, Constraint on Storage Space, Possible Solutions
- OLAP Operations in Multi-dimensional Data Model: Roll-up, Drill-down, Slice & Dice, Pivot (Rotate)
- Indexing OLAP Data; Efficient Processing of OLAP Queries
- Type of OLAP Servers: ROLAP versus MOLAP versus HOLAP
- Metadata Repository

Data Warehouse Architecture; Further Development of Data Cube & OLAP Technology

- The Design of A Data Warehouse: A Business Analysis Framework; The Process of Data Warehouse Design
- A 3-Tier Data Warehouse Architecture; Enterprise Warehouse, Data mart, Virtual Warehouse
- Discovery-Driven Exploration of Data Cubes; Complex Aggregation at Multiple Granularity: Multi-feature Cubes
- Constrained Gradient Analysis of Data Cubes

Unit: 2 – Pre-processing

- The need for Pre-processing, Descriptive Data Summarization
- Data Cleaning: Missing Values, Noisy Data, Data Cleaning as a Process
- Data Integration & Transformation
- Data Cube Aggregation; Attribute Subset Selection
- Dimesionality Reduction: Basic Concepts only
- Numerosity Reduction: Regression & Log-linear Models, Histograms, Clustering, Sampling
- Data Dicretization & Concept Hierarchy Generation
- For Numerical Data: Binning, Histogram Analysis, Entropy-based Discretization, Interval Merging by x2 Analysis, Cluster Analysis, Discretization by Intuitive Partitioning
- For Categorical Data

Data Mining: Introduction

- An Overview; What is Data Mining; Data Mining – on What Kind of Data
- Data Mining Functionalities – What Kind of Patterns Can be Mined; Concept/Class Description: Characterization & Discrimination; Mining Frequent Patterns, Associations, and Correlations; Classification & Prediction; Cluster Analysis; Outlier Analysis
- Are All of the Patterns Interesting
- Classification of Data Mining Systems
- Data Mining Task Primitives
- Integration of a Data Mining System with a Database or Data Warehouse System
- Major Issues in Data Mining

Unit: 3 – Attribute-Oriented Induction: An Alternate Method for Data Generalization & Concept Description

- Attribute-Oriented Induction for Data Characterization, and Its Efficient Implementation; Presentation of the Derived Generalization
- Mining Class Comparisons: Discrimination between Different Classes
- Class Descriptions: Presentation of both Characterization & Comparison

Unit: 4 – Mining Frequent Patterns, Associations, and Correlations

- Basic Concepts: Market Basket Analysis; Frequent Itemsets, Closed Itemsets, and Association Rules; Frequent Pattern Mining: A Roadmap
- Apriori Algorithm: Finding Frequent Itemsets Using Candidate Generation; Generating Association Rules from Frequent Itemsets; Improving the Efficiency of Apriori
- From Association Mining to Correlation Analysis; Strong Rules Are Not Necessarily Interesting: An Example; From Association Analysis to Correlation Analysis

Unit: 5 – Classification & Prediction

- Introduction to Classification and Prediction; Basics of Supervised & Unsupervised Learning; Preparing the Data for Classification and Prediction; Comparing Classification and Prediction Methods
- Classification by Decision Tree Induction, Attribute Selection Measures; Tree Pruning; Scalability and Decision Tree Induction
- Rule-based Classification: Using IF-THEN Rules for Classification; Rule Extraction from a Decision Trees; Rule Induction Using a Sequential Covering Algorithm
- Bayesian Classification: Bayes' Theorem, Naïve Bayesian Classification; Bayesian Belief Networks
- An Overview of Other Classification Methods (2 Lectures)
- Prediction: Linear Regression; Non-linear Regression; Other Regression Models
- Classifier Accuracy and Error Measures: Classifier Accuracy Measures; Predictor Error Measures
- Evaluating the Accuracy of a Classifier or Predictor: Holdout Method and Random Subsampling; Cross Validation; Bootstrap
- Ensemble Methods – Increasing the Accuracy: Bagging; Boosting

Cluster Analysis

- Introduction to Cluster Analysis; Types of Data in Cluster Analysis; A Categorization of major Clustering Methods
- Partitioning Methods; Centroid-Based Technique: K-Means Method; Overview of Other Clustering Methods
- **An Overview of Other Clustering Methods (2 Lectures)**
- Outlier Analysis; Statistical Distribution-based Outlier Detection; Distance-based Outlier
- Detection; Density-based Outlier Detection; Deviation-based Outlier Detection

Chapter wise Coverage from the Text Books

Unit-1: 3.1, 3.1.1, 3.2, 3.2.1 to 3.2.6, 3.4.1 to 3.4.3, 3.3.4, 3.3.5, 3.3, 3.3.1, 3.3.2, 4.2.1 to 4.2.3

Unit-2: 2.1, 2.2, 2.2.1 to 2.2.3, 2.3.1 to 2.3.3, 2.4.1, 2.4.2, 2.5.1, 2.5.2, (Introductory Portion of 2.5.3), 2.5.4, 2.6, 2.6.1, 2.6.2, 1.1 to 1.3: 1.3.1 to 1.3.4, 1.4, 1.4.1 to 1.4.5, 1.5 to 1.9

Unit-3: 4.3.1 to 4.3.5

Unit-4: 5.1.1 to 5.1.3, 5.2.1 to 5.2.3, 5.4, 5.4.1, 5.4.2

Unit-5: 6.1, 6.2, 6.2.1, 6.2.2, 6.3, 6.3.1 to 6.3.4, 6.5, 6.5.1 to 6.5.3, 6.4, 6.4.1 to 6.4.3, 6.11, 6.11.1 to 6.11.3, 6.12,6.12.1, 6.12.2, 6.13, 6.13.1 to 6.13.3, 6.14, 6.14.1, 6.14.2, 7.1, 7.2, 7.2.1 to 7.2.5, 7.3, 7.4, 7.4.1, 7.11, 7.11.1 to 7.11.4

Accomplishment of the students after completing the course

- ✓ Ability to create a Star Schema for a given Data Warehousing requirements

- ✓ Ability to decide the number & levels of pre-computed Data Cubes, the corresponding Metadata, and the appropriate OLAP operation Warehouse
- ✓ Ability to apply pre-processing on existing operational & historical data for creation of Data
- ✓ Ability to apply Apriori algorithm for Association Mining
- ✓ Ability to apply Decision Tree and Bayesian algorithms for Classification
- ✓ Ability to mine Statistical Measures in large databases
- ✓ Ability to differentiate between Classification & Clustering, and similarly between Supervised Learning & Unsupervised Learning

Suggested Continuous Evaluation Components (CEC) Data Warehousing & Datamining

- ✓ Data Warehouse Applications: CRM; SCM; Banking sector; Insurance sector; Retail banking Industry case study, Hospital application.
- ✓ Design a data mart from scratch to store the credit history of customers of a bank. Use this credit profiling to process future loan applications.
- ✓ Design and build a Data Warehouse using bottom up approach titled 'Citizen Information System'. This should be able to serve the analytical needs of the various government departments and also provide a global integrated view.

Group Project

- ✓ Based on their collective work experience, each group should identify, and to the extent possible, execute a business intelligence project that relies on the data mining techniques we will cover in the class. The key tasks here are:
- ✓ To identify a business problem or a series of interesting questions that deal with either classification, prediction or clustering
- ✓ Identify sources of data that could potentially be useful in addressing your questions
- ✓ Pre-process – clean, validate, visualize your data
- ✓ Develop your model considering alternative techniques, selecting the most appropriate one in the process.
- ✓ Interpret your results, and write a final report including an executive summary of your findings. This will be due during the finals week.
- ✓ Prepare a 10-15 minute presentation for the last class meeting

Laboratory Exercise to be performed on WEKA using the given dataset

Association Rules:

1. Try to find association rules for car database. Does all the rules are good?
   2. Modify the car so that all the classes have a uniform distribution.
   Try to find association rules from modified car database. What happened to the rules now?
   3. Try to find association rules for credit database.
   Then remove the attribute "foreing_worker". What happened to the rules now?
   4. Try to find association rules for one or more of the remaining databases. List the rules as per the lift ratio. Does all the rules are important?

Clustering:

1. Select Iris database and applied density-based clustering technique.
   How is the distribution of data lookalike?
2. Performs the same operation with Centroid-Based clustering technique on following databases: wine or WDBC. What are the clusters lookalike?

3. Performs the same operation with the database sponge.

   Are you able to interpret the results in this case?

Decision Tree and Basian Classification

1. Perform the following tests on whether database: generates a decision tree and a Bayesian Classifiers.

- Repeat network to solve the problem, and performs a validation with 10 folds.
    - Repeat the experiment validating the results on the training set itself.
    - Repeat the same test with iris database.
    - Justify the results.

2. Repeat once more the same tests with the contact database. Compare the results with the results of exercise 1, justify the classes.
    - ✓ Try different classifiers on whether database and compare the results of them.
    - ✓ Try different attributes to classify the database, use attribute selection method to select splitting attributes.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MASTERS OF COMPUTER APPLICATION (MCA)
Year – III (Semester – V) (W.E.F. June 2017)
Subject Name: Cyber Security & Forensic Science (CSFS) – MCA-502

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Objectives:

- To understand the major concepts of Cyber Security and Forensics and to create the awareness through simple practical tips and tricks and to educate the students to learn how to avoid becoming victims of cyber crimes.
- The subject and the course content will help to the student who wish to take up cyber forensics as career as well as those who want to seek careers in cyber security.
- To gain experience of doing independent study and research in the field of cyber security and cyber forensics.

Prerequisites:

Basic fundamental knowledge of Networking, Web Application, Mobile Application and Relational Database Management System

Contents:

UNIT I: Cybercrime and Cyber Offenses [20%]

Introduction to Cybercrime:

Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/Salami Technique, Data Diddling, Forgery, Web Jacking, Newsgroup Spam/Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking, Online Frauds, Pornographic Offenses , Software Piracy, Computer Sabotage, E-Mail Bombing/Mail Bombs, Usenet Newsgroup as the Source of Cybercrimes , Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft

Cyber Offenses: How Criminals Plan Them

Introduction, Categories of Cybercrime, How Criminals Plan the Attacks: Reconnaissance, Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information, Attack (Gaining and Maintaining the System Access), Social Engineering, and Classification of Social Engineering, Cyberstalking: Types of Stalkers, Cases Reported on Cyberstalking, How Stalking Works? Real-Life Incident of Cyberstalking, Cybercafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Botnet, Attack Vector Cloud Computing: Why Cloud Computing? , Types of Services, Cybercrime and Cloud Computing

UNIT- II: Cyber Crime: Computer and Human Devices [20%]

Cybercrime: Mobile and Wireless Devices

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era: Types and Techniques of Credit Card Frauds, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices Authentication Service Security: Cryptographic Security for Mobile Devices, LDAP Security for Hand-Held Mobile Computing Devices, RAS Security for Mobile Devices, Media Player Control Security, Networking API Security for Mobile Computing Applications, Attacks on Mobile/Cell

Phones: Mobile Phone Theft, Mobile Viruses, Mishing, Vishing, Smishing, Hacking Bluetooth, Mobile Devices: Security Implications for Organizations: Managing Diversity and Proliferation of Hand-Held Devices, Unconventional/Stealth Storage Devices Threats through Lost and Stolen Devices, Protecting Data on Lost Devices, Educating the Laptop Users

Organizational Measures for Handling Mobile Devices-Related Security Issues: Encrypting Organizational Databases, Including Mobile Devices in Security Strategy, Organizational Security Policies and Measures in Mobile Computing Era: Importance of Security Policies relating to Mobile Computing Devices, Operating Guidelines for Implementing Mobile Device Security Policies, Organizational Policies for the Use of Mobile Hand-Held Devices, Laptops: Physical Security Countermeasures

Phishing and Identity Theft

Introduction, Phishing: Methods of Phishing, Phishing Techniques, Spear Phishing, Types of Phishing Scams, Phishing Toolkits and Spy Phishing, Phishing Countermeasures, Identity Theft (ID Theft): Personally Identifiable Information(PII), Types of Identity Theft, Techniques of ID Theft, Identity Theft-Countermeasures, How to Protect your Online Identity

UNIT- III: Cybercrime Weapons [20%]

Tools and Methods Used in Cybercrime

Introduction, Proxy Servers and Anonymizers, Phishing: How Phishing Works? Password Cracking: Online Attacks, Offline Attacks, Strong, Weak and Random Passwords, Random Passwords, Keyloggers and Spywares: Software Keyloggers, Hardware Keyloggers, Antikeylogger, Spywares, Virus and Worms: Types of Viruses, Trojan Horses and Backdoors: Backdoor, How to Protect from Trojan Horses and Backdoors, Steganography: Steganalysis, DoS and DDoS Attacks: DoS Attacks, Classification of DoS Attacks, Types or Levels of DoS Attacks, Tools Used to Launch DoS Attack, DDoS Attacks, How to Protect from DoS/DDoS Attacks, SQL Injection: Steps for SQL Injection Attack, How to Avoid SQL Injection Attacks, Buffer Overflow: Types of Buffer Overflow, How to Minimize Buffer Overflow, Attacks on Wireless Networks: Traditional Techniques of Attacks on Wireless Networks, Theft of Internet Hours and Wi-Fi-based Frauds and Misuses, How to Secure the Wireless Networks

UNIT- IV: Cyber Law [20%]

Cybercrimes and Cyber Security: The Legal Perspectives

Introduction, Why Do We Need Cyberlaws: The Indian Context, The Indian IT Act: Admissibility of Electronic Records: Amendments made in the Indian ITA 2000, Positive Aspects of the ITA 2000, The Weak Areas of the ITA 2000, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act

Amendments to the Indian ITA 2008: Overview of Changes Made to the Indian IT Act, Cybercafe-Related Matters Addressed in the Amendment to the Indian IT Act, State Government Powers Impacted by the Amendments to the Indian IT Act, Impact of IT Act Amendments Impact Information Technology Organizations, Cybercrime and Punishment, Cyberlaw, Technology and Students: Indian Scenario

UNIT- V: Computer Forensics [20%]

Understanding Computer Forensics

Introduction, Historical Background of Cyberforensics, Digital Forensics Science, The Need for Computer Forensics, Cyberforensics and Digital Evidence: The Rules of Evidence,Forensics Analysis of E-Mail: RFC282, Digital Forensics Life Cycle: The Digital Forensics Process,The Phases in Computer Forensics/Digital Forensics, Precautions to be Taken when Collecting Electronic Evidence, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation: Typical Elements Addressed in a Forensics Investigation Engagement Contract, Solving a Computer Forensics Case, Setting up a Computer Forensics Laboratory: Understanding the Requirements, Computer Forensics and Steganography: Rootkits, Information Hiding,

Relevance of the OSI 7 Layer Model to Computer Forensics: Step 1: Foot Printing, Step 2: Scanning and Probing, Step 3: Gaining Access, Step 4: Privilege, Step 5: Exploit, Step 6: Retracting, Step 7: Installing Backdoors, Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics: Technical Challenges: Understanding the Raw Data and its Structure, The Legal Challenges in Computer Forensics and Data Privacy Issues, Special Tools and Techniques: Digital Forensics Tools Ready Reckenor, Special Technique: Data Mining used in Cyberforensics, Forensics Auditing, Antiforensics

Forensics of Hand-Held Devices

Introduction, Hand-Held Devices and Digital Forensics: Mobile Phone Forensics, PDA Forensics, Printer Forensics, Scanner Forensics, Smartphone Forensics, iPhone Forensics, Challenges in Forensics of the Digital Images/Still Camera, Forensics of the BlackBerry Wireless Device, Toolkits for Hand-Held Device Forensics: EnCase, Device Seizure and PDA Seizure, Palm DD, Forensics Card Reader, Cell Seizure, MOBILedit!, ForensicSIM, Organizational Guidelines on Cell Phone Forensics: Hand-Held Forensics as the Specialty Domain in Crime Context

Cybercrime: Illustrations, Examples and Mini-Cases, Scams
(Only for the referential context should not be asked in the examination)

Real-Life Examples

Example 1: Official Website of Maharashtra Government Hacked
Example 2: E-Mail Spoofing Instances
Example 3: I Love You Melissa – Come Meet Me on the Internet
Example 4: Ring-Ring Telephone Ring: Chatting Sessions Turn Dangerous
Example 5: Young Lady's Privacy Impacted
Example 6: Indian Banks Lose Millions of Rupees
Example 7: "Justice" vs. "Justice": Software Developer Arrested for Launching Website Attacks
Example 8: Parliament Attack
Example9: Pune City Police Bust Nigerian Racket

Mini-Cases:

Mini-Case 1: Cyberpornography Involving a Juvenile Criminal
Mini-Case 2: Cyberdefamation: A Young Couple Impacted
Mini-Case 12: Internet Used for Murdering
Mini-Case 13: Social Networking Victim – The MySpace Suicide Case
Mini-Case 16: NASSCOM vs. Ajay Sood and Others

Online Scams:

Scam No. 1 – Foreign Country Visit Bait
Scam No. 2 – Romance Scam
Scam No. 3 – Lottery Scam
Scam No. 4 – Bomb Scams
Scam No. 5 – Charity Scams
Scam No. 6 – Fake Job Offer Scam

Financial Crimes in Cyber Domain:

Financial Crime 1: Banking Related Frauds
Financial Crime 2: Credit Card Related Frauds

Text Book:

Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives – Nina Godbole, Sunit Belapur, Wiley India Publications Released: April 2011

Additional Reference Books:

- Internet Forensics: Using Digital Evidence to Solve Computer Crime
  Robert Jones, O'Reilly Media, Released: October 2005
- Windows Forensics: The field guide for conducting corporate computer investigations
  Chad Steel, Wiley India Publications Released: December 2006

Chapter wise Coverage from the Text Books:

Reference Book: 1
Chapter 1: 1.1 to 1.5
Chapter 2: 2.1 to 2.8
Chapter 3: 3.1 to 3.12
Chapter 4: 4.1 to 4.12
Chapter 5: 5.1, 5.2, 5.3
Chapter 6: 6.1, 6.3, 6.4, 6.5, 6.6, 6.8, 6.9, 6.10
Chapter 7: 7.1 to 7.14, 7.16, 7.17, 7.18, 7.19
Chapter 8: 8.1, 8.3, 8.4, 8.8

Additional Reference Books are for getting the relevant contents in more detail.
[Approximate Pages 280 -310]

PRACTICAL/EXPERIMENT LIST:

1. Implement the concept of active attacks and used the tools for it. (ipconfig, ifconfig, iwconfig, hmap, hping fping, httping, arping, nslookup, mailsnarf, httping, netcat, nmap, traceart, website watcher)
2. Experiment on registry setting and some basic changes in registry edit like drive hide desktop change etc.
3. Implement the password cracking methods (Password Changer, Cain, Abel, & Loph Crack)
4. Implement the WEP and WPA password hacking methods.
5. Install Keylogger and hack the user credentials.
6. Implement the concept of phishing by creating identical fake website and get user credentials.
7. Implement the information hiding and stegenography. (Snort).
8. Perform SQL injection on a website.
9. Install rootkits and report different variety of options.(chk)
10. Recover the deleted data and files. (recoverjpeg, recovermov, foremost)
11. Demonstrate the use of MobilEdit.
12. Demonstrate the use of hacking of Bluetooth data. (Bluesnarf)

Kadi Sarva Vishwavidyalaya, Gandhinagar
MASTERS OF COMPUTER APPLICATION (MCA)
Year – III (Semester – V) (W.E.F. June 2017)
Subject Name: Cloud Infrastructure & Services (CIS)– MCA-503

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Tutorial	Th	Th	Th.	Pr.	
5	3	2	25	25	50	0	100

Learning Objectives:

- To provide an understanding of the basic concepts of parallel and distributed computing and their role in Cloud Computing.
- To study the concept of Virtualization and relevant technologies available in the market
- To understand the importance of Cloud computing for higher throughput
- To make aware about availability of various Cloud platforms
- To study different application of Cloud and Cloud management techniques

Prerequisites:

- Basic knowledge of Computer Networks and Network protocol suits
- Understanding of process and thread management

Course Contents:

Unit No	Contents	Hours
1	Introduction to Cloud Computing: Cloud Computing basics, History to Cloud Computing, Importance of Cloud Computing in the Current Era, Characteristics of Cloud Computing and What Cloud Computing Really is? Move to Cloud Computing: Pros and Cons of Cloud Computing, Nature of Cloud, Technologies in Cloud Computing, Migrating into the Cloud Types of Cloud: Public and Private Cloud, Cloud Infrastructure, Cloud Application Architecture Working of Cloud Computing: Trends in Computing, Cloud Service Models, Cloud Deployment Models, Pros and Cons of Cloud Computing, Cloud Computing and Services Cloud Architecture: Cloud Computing Logical Architecture, Developing Holistic, Cloud Computing Reference Model, Cloud System Architecture, Cloud Deployment Model Cloud Services: Cloud Types and Services, Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service(IaaS), Other Cloud Services	12 (20%)
2	Foundations: Definition of Virtualization, Adopting Virtualization, Virtualization Architecture and software, Virtual Clustering, Virtualization Applications, Pitfalls of Virtualization Grid, Cloud and Virtualization: Virtualization in Grid, Virtualization in Cloud, Virtualization in Cloud Security Virtualization and Cloud Computing: Anatomy of Cloud Infrastructure, Virtual Infrastructures, CPU Virtualization, Network and Storage Virtualization	8 (20%)

3	Data Storage: Introduction to Enterprise Data Storage, Data Storage Management, File Systems ,Cloud Data Stores, Using Grids for Data Store Cloud Storage: What is Cloud Storage?, Overview of Cloud Storage, Data Management for Cloud Storage, Provisioning Cloud Storage, Data-intensive Technologies for Cloud Computing Cloud Storage from LANs to WANs: Introduction, Cloud Characteristic, Distributed Data Storage, Applications Utilizing Cloud Storage Risks in Cloud Computing: Introduction, Risk Management, Cloud Impact, Enterprise Wide Risk Management, Types of Risks in Cloud Data Security in Cloud: Introduction, Current State, Homo Sapiens and Digital Information, Cloud, Digital Persona and Data Security, Content Level Security Cloud Security Services: Objectives, Confidentiality , Integrity and Availability, Security Authorization Challenges in the Cloud, Secure Cloud Software Requirements, Secure Cloud Software Testing	12 (20%)
4	Tools and Technologies for Cloud: Parallel Computing, Eras of Computing, High Performance Parallel Computing with cloud and cloud Technologies, Cloud Computing Application Platform, Cloud Computing Platform, Tools for Building Cloud Microsoft Cloud Services: Introduction, Windows Azure Platform Google Cloud Applications: Google Applications Utilizing Cloud, Google App Engine Amazon Cloud Services: Understanding Amazon Web Components and Services, Elastic Compute Cloud (EC2), Amazon Storage System, Amazon Database Services Cloud Applications: Cloud – Based Solutions, Cloud Computing Services, Cloud Software for Private Banking, Cloud Software for Asset Management, Cloud Software for Fund Management	8 (20%)
5	Google App Engine(GAE): Understand the development of scalable web application on Google's cloud, Build and deploy simple web applications to Google's cloud, Develop simple application using Google App Engine (GAE) and its services	8 (20%)

Reference 1 (Main Reference)

"Cloud Computing A practical approach for learning and implementation" by A.Srinivasan and J.Suresh Pearson Publications (Unit # : 1,2,3,4)

Unit 5:

http://appengine.google.com
http://cloud.google.com/appengine/docs/java/tools/uploadinganapp
https://cloud.google.com/appengine/docs/java/tools/eclipse
https://cloud.google.com/appengine/docs/java/gettingstarted
https://cloud.google.com/appengine/docs/java/gettingstarted/setup
https://cloud.google.com/appengine/docs/java/gettingstarted/creating
https://cloud.google.com/appengine/docs/java/gettingstarted/ui_and_code

Suggested Additional Reading

1. Cloud Computing: A practical approach by Anthony T. Vetle – Tata McGraw Hill Education Private Limited (2009)
2. Cloud Computing For Dummies-- Judith Hurwitz , Robin Bloor , Marcia Kaufman , Fern Halper - – Wiley India Pvt Ltd
3. Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More (Student Edition) - Kris Jamsa- Published by - Jones & Bartlett Learning
4. Cloud Computing Bible - Barrie Sosinsky – Wiley India Pvt Ltd (2011)
5. Rajkumar Buyya, Christian Vechhiola, S.Thamarai Selvi , "Mastering Cloud Computing ", McGraw Hill Education (India) Private Limited.

Chapter wise Converge from Main Reference:

Unit #	Chapters
Unit 1	1,2,3,4,6,16
Unit 2	8,9,10
Unit 3	11,12,13,18,19,20
Unit 4	24,29,30,31,32
Unit 5	Reference http://appengine.google.com

Accomplishment of the Student after Completing the Course: (Cloud Infrastructure & Services)

- Understand the role of thread and process in distributed and parallel processing and can aware about the transformation of a stand alone or web based application from distributed and/or parallel to Cloud application
- Understand the principals of Cloud computing
- Ability to understand the concepts of virtualization
- Gain an exposure about Google App Engine for Java
- Aware about various services provided by Cloud Computing (SaaS, IaaS, HaaS etc…)
- Gain an exposure about various Cloud platforms available in the IT market

Kadi Sarva Vishwavidyalaya, Gandhinagar
MASTERS OF COMPUTER APPLICATION (MCA)
Year – III (Semester – V) (W.E.F. June 2017)
Subject Name: J2EE – MCA-504(A)

Sub Total Credit	Teaching scheme		Examination scheme					Rationale (Course Objective) :
	(per week)		MID	CEC	External		Total Marks	
	Th	Pr	Th	Th	Th.	Pr.		
5	3	4	25	25	50	50	150	

The objective of this course to impart the knowledge and develop skills of the usage of the software platform - J2EE with objective of the development the industry required applications using Struts, SOA with BPEL , JSF , Ajax and related concepts and components. The theory guidance will be laboratory work supported to provide leaner extensive hands-on sessions for building and implementation of developed.

Learning Outcome:
Students will be able to develop SOA with Web Services, ORM, and JSF etc. using the platform of J2EE.

Instructional Strategies:

- Problem solving approach in Theory sessions
- Components building and integration in lab sessions
- Application implementation and testing
- Integration of cooperating applications to shape project
- Emphasis on self study, presentation in seminars, acceptance testing of developed applications .

Course Content:

Unit 1 Spring Framework (20%)
Spring Architecture, Spring & MVC, Spring Context definition, Spring Framework, Spring Modules, Inversion of Control (IoC) in Spring, Aspect Oriented programming in Spring (AOP).

Unit 2 Enterprise Java Bean (20%)
EJB, Review of Types of EJB, EJB container client, Client interaction with bean, Server side component types, Session Beans, Stateless session bean, Stateful session bean, Message driven bean, Entity bean.

Unit 3 ORM (Object Relationship Mapping) (20%)
Introduction to ORM, Introduction to hibernate, Ideal solution for RDBMS and Object, Hibernate Objects, Hibernate Configuration files, Session operations, Mapping of relations, Fetching strategies, Querying using HQL, Hibernate Caching , JPA overview, JPA Key Concepts, Mapping Persistent Objects, Entity Relationship mapping , Query API And JPQL.

Unit 4 JSF(Java Server Faces) (20%)
Introduction to JSF, Overview of JSF architecture, concepts and features, JSF Request Process Life Cycle, UI Component Model, Using JSF Tag Libraries, Core Tags, Backing Beans, Page Navigation, Handling Events, Performing Validation and Data Conversion, Navigating between pages, Custom Components in JSF, Creating JSF project.

Unit 5 XML and Web Services (20%)

Service Oriented Architecture & Web Service, finding web services, describing a web service, developing web services using EJB with SOAP and REST

Text Books:

1. Java Server Programming J2EE 1.4 Ed. Black Book, Dreamtech Software Team, Kogent Solutions Inc.

Chapters

Chapter 11,13,14,15,19,21

Reference Book:

1. "Programming Jakarta Struts", Chuck Cavaness , O'Reilly Publication 2nd Edition
2. "EJB 3.0 in Simple Steps", Dreamtech Press, Kogent Solutions Inc
3. "Spring in Action", Craig Walls, Ryan Breidenbach, Dreamtech Press.

Practical: JDK, Netbeans, Eclipse and other suitable tools may be used to perform lab works.

Practical : Template Assignments

1. Develop an application which will take an input from user using suitable GUI say Student Roll No, Name, Address, Attendance(in %). Prepare on student controller which will keep all the information of student and show the detail information in result.jsp page(Use Spring Framework)
2. Assume that we have got three pdf files for the MCA-1 Syllabus, MCA-2 Syllabus and MCA-3 Syllabus respectively, Now write a Struts program which displays the appropriate PDF file to the client, by looking at a request parameter for the year (1, 2 or 3).
3. Assume that the information regarding the marks for all the subjects of a student in the last exam are available in a database, Develop a web service which takes the enrollment number of a student as a request parameter and displays the marksheet for the student.
4. Develop a CURD application using Spring and Hibernate to manage Employee task details. To perform the above operations create one table named EmployeeJob.

   Field Name Field Type
   EmpId Integer
   Empname Varchar
   Job_Allocation_datetime date
   Job_completion_time date
   Job_Hours int
5. Develop a CURD application using JSF and Hibernate to manage Student Marksheet.
6. Develop a spring application with hibernate to authenticate a user, where the loginid and password are available as request parameters. In case the authentication is successful, it should setup a new session and store the user's information in the session before forwarding to home.jsp, which displays the user's information like full name, address, etc.
7. Create a spring curd application to maintain course (Using JDBC)
8. Create a spring application with web services called Product with the following properties: name, description, price. Create a listener that notifies (through System.out) whenever a user adds a product to a shopping cart (i.e. adds an object to the session object) or removes it again. Hint: check out the class HttpSessionAttributeListener. Make it print the name and price of the object (hint: access the session through the HttpBindingEvent object). Also, let the listener print the total price of all objects saved in the session so far (one way to accomplish this could be to keep a collection of all objects saved to the session – or just their keys – in the listener or an associated class).
9. Develop an application using Spring to demonstrate how the client (browser) can remember the last time it visited a page and displays the duration of time since its last visit. (Hint: use Cookie).

10. Develop a JSF application to perform the database driven operation like insert, Delete, Update and select. To perform the above operations create one table named Employee.

Field Name Field Type
EmpId Integer
Empname Varchar
Emp_desig Varchar
Emp_J_Date Varchar
Emp_Salary Numeric

Kadi Sarva Vishwavidyalaya, Gandhinagar
MASTERS OF COMPUTER APPLICATION (MCA)
Year – III (Semester – V) (W.E.F. June 2017)
Subject Name: Web Development Tools – II (WDT-II)– MCA-504(B)

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Learning Objectives:
The purpose of this course is to give students an understanding of both the Applications. This course covers some advanced topic in ASP.NET, so that student can develop projects for the industry.

Prerequisites: Knowledge of Client Server Architecture, Use of Controls & Server, database, ASP.Net web services

Course Contents:

Unit Content **Weight**

Unit – 1 Introduction ASP.NET **20%**

- Introducing ASP.NET MVC 4
  - What Is ASP.NET? | ASP.NET Web Pages | ASP.NET MVC |
- Installing ASP.NET MVC 4
  - Software Requirements for ASP.NET MVC4 | Installing ASP.NET MVC 4 Server Components | Visual Studio Application Templates | Anatomy of ASP.NET MVC 4 Internet Application
- ASP.NET MVC 4 Web Application
  - Description of the Application | Creating the Database |

Unit – 2 MVC Architecture **20%**

- Understanding Controllers
  - The Routing Engine | Creating Controllers | Working with Action Methods
- Understanding Views
  - View Engines | Working with Views | The Rendering Process | Understanding the Razor View Engine | Working with ViewData and ViewBag | Working with Strongly Typed Views | Understanding ASP.NET MVC Mobile features
- Understanding Models
  - What Are Models? | Adding a Business Model | Adding View Models | Understanding Model Binding

Unit – 3 Data, AJAX, jQuery, & Web API **20%**

- Data validation
  - The Validation Workflow | Manual Validation | Validation with Data Annotations | Creating Custom Data Annotations

- AJAX and JQuery
    - Introducing JQuery | Understanding Unobtrusive Javascript | Working with Ajax | Working with JSON | Introducing Web API
- Security
    - Authentication and Authorization| Securing Controllers and Action Methods | Authenticating with External Sources | Implementing Membership and Roles | Securing ASP.NET MVC Applications Against External Attacks

Unit – 4 Testing Application 20%

- Routing
    - Routing Concepts | Creating Custom Routs | Creating a Catch-all Segment | Adding Constraints to Routes | Understanding when Routing is Not Applied | ASP.NET Routing Vs. URL Rewriting | Generating Links and URLs
- Testing the Application
    - Understanding Unit Testing | Examining the Test Project | Testing Controllers | Testing Routes

Unit-5 Deploying Application 20%

- Preparing the Application for Deployment | Deploying to an In-House Server | Deploying to Windows Azure

Book: Beginning ASP.NET MVC 4, Apress

Chapter wise coverage

Unit 1: CH# 1, 2, 3
Unit 2: CH# 4, 5, 6
Unit 3: CH# 7, 8, 9
Unit 4: CH# 10, 11, 12

Useful links for practical

- http://www.asp.net/web-api/overview/older-versions
- http://www.asp.net/mvc/overview/older-versions/getting-started-with-ef-5-using-mvc-4/implementing-basic-crud-functionality-with-the-entity-framework-in-asp-net-mvc-application

Practical List

Getting Started with ASP.NET MVC 4

1. Intro to ASP.NET MVC 4
2. Adding a Controller
3. Adding a View
4. Adding a Model
5. Accessing Your Model's Data from a Controller
6. Examining the Edit Methods and Edit View
7. Adding a New Field to the Movie Model and Table
8. Adding Validation to the Model
9. Examining the Details and Delete Methods

Getting Started with EF5 using MVC 4

1. Creating an Entity Framework Data Model
2. Implementing Basic CRUD Functionality
3. Sorting, Filtering, and Paging
4. Creating a More Complex Data Model
5. Reading Related Data
6. Updating Related Data
7. Handling Concurrency
8. Implementing Inheritance
9. Implementing the Repository and Unit of Work Patterns
10. Advanced Entity Framework Scenarios

API

1. Enabling CRUD Operation in Web API 1
2. Using ASP.NET Web API1 with EF5
3. Self-Host Web API 1(C#)
4. Build RESTful API's with ASP.NET Web API

Kadi Sarva Vishwavidyalaya, Gandhinagar
MASTERS OF COMPUTER APPLICATION (MCA)
Year – III (Semester – V) (W.E.F. June 2017)
Subject: Programming using Open Source - MCA-504(C)

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Description:

The objective of this course is based on understanding Overview, Tools, Technology and Applications. The development of applications in diversified domains is to be carried out in python environment and their allied tools.

Learning Objectives:

Students will learn to program in interactive mode for initial development with lot of time saving in development resulting in lesser development cost with:

- high speed matrix operations
- advance data structures in-built to the system
- efficient graphics and visualization
- high performance code optimization and executions

Prerequisites :

- Knowledge of Programming languages such as C, JAVA and .NET
- Analysis of coding complexities.

Unit 1 : About Python

- **Python language:** Components of the Python language System, Using Python in interactive mode with basic operations and built-in functions.
- **Built-in Data Types, Variables, expressions and statements :** Core Native Data Types, inf and NaN, Floating point precision, Variable Names, Values and types, keywords, Operators, Expressions and statements, Order of Operations, String operations, Comments.
- **Arrays and Matrices :** 1-dimensional Arrays, 2-dimensional Arrays, Multidimensional Arrays, Array Operations, Array and Matrix Functions- Views, Shape Information and Transformation, Linear Algebra Functions, Structured Arrays - Mixed Arrays with Column Names, Record Arrays.

Unit II: Programming Basics

- **Flow Control, Loops / Iteration :** if . . . elif . . . else, for, while, break, Exception Handling - try . . . except.
- **String Manipulation :** String Building, String Functions, Formatting Numbers, Regular Expressions, Conversion of Strings.

- **Functions :** Basic Functions - Rounding, Mathematical, Complex Values, Set Functions, Sorting, Nan Functions , Type conversion functions, Dates and Times Functions - Creating Dates and Times, Dates Arithmetic, Customs functions, Modules and Packages, recursion.

Unit III: Programming Advance Features

- **Lists :** Properties, Operations, Traversing, Slicing, Methods, Deleting elements, Map, filter and reduce, Lists and strings, Objects and values, Aliasing, List arguments.
- **Dictionaries :** properties, Operations, Methods, Memos, Global variables, Long integers.
- **Tuples :** Properties, Operations, Methods, return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Comparing tuples, Sequences of sequences.
- **Graphics :** 2D Plotting, Advanced 2D Plotting, 3D Plotting, Exporting Plots, Data Analytics and Visualization.

Unit IV: Files and File System

- **Files Operations:** Persistence, Reading and writing, Format operator, Filenames and paths, Writing modules, Catching exceptions, Databases, Pickling, Pipes.
- **File System Operations :** Creating, Changing and Deleting Directories, Listing contents of Directory, Copying, Moving and Deleting Files.

Unit V: High Performance Coding and Execution

- **Object Oriented Programming (OOP) and GUI :** Classes and objects, Classes and functions, Classes and methods, Inheritance, Database Connectivity and simple network programming.
- **GUI Development :** Buttons and callbacks, Canvas widgets, Coordinate sequences, More widgets, Packing widgets, Menus and Callables, Binding, Card objects.
- **Code Optimization :** Timing Code, Vectorization for Unnecessary Loops, loop dimension alternations, broadcasting alternations, In-place assignment uses, inline function frequent calls, consideration of data locality in Arrays.
- **Code Executing in Parallel :** Converting a Serial Program to Parallel, multiprocessing, map and related functions, Python's Parallel Cluster, Parallel execution related concerns.

Reference Books:

- Python 2.1 Bible by Dave Bruck & Stephen Tanner, Hungry Minds Inc..
- Parallel Programming with Python by Jan Palach.
- Practical Programming - an Introduction to Computer Science Using Python by Jennifer Campbell, Paul Gries, Jason Montojo, Greg Wilson.
- Fundamentals of Programming Python by Richard L. Halterman.
- Minecraft Pi Book, by Craig Richardson.
- Laboratory Manual for Computer Programming with Python and Multisim™, by James M. Fiore.
- FOSS Lab Manual.
- Rapid GUI Programming with Python and Qt by Mark Summerfield.
- Python Cookbook, by David Ascher, Alex Martelli, Anna Ravenscroft.
- Python Programming for Absolute Beginner by Michael Dawson.
- Introduction to Python for Econometrics, Statistics and Data Analysis by Kevin Sheppard.

- A Comprehensive Introduction to Python Programming and GUI Design Using Tkinter by Bruno Dufour (McGill).
- Learning to program with python by Richard L. Halterman.
- Learning to Program Using Python by Cody Jackson.

Hands-on Development Domain:

- Python OS variants 2.X or 3.X (latest avaliable version).
- Computing with numpy, scipy, matplotlib.
- GUI with QT / Tk.
- Python tools for code optimization and parallel processing.

Hands-on Development Sessions:

- Setting Up of Python environment with relevant tools on Windows / Other O.S.
- Programming in Interactive Step Mode using commands, functions and programming elements.
- Programming in Script Mode.
- Extensive use of Lists and Dictionaries in python utility programs.
- Writing functions and building library of developer needed utility functions.
- Exception Handling, Files and File systems programming.
- Software Objects and Object Oriented Programming.
- Graphics and Image processing.
- Data Analytics and Visualization.
- GUI development.
- Database integrated Web services utility program development.
- High Performance/Throughput computing with Parallel Processing.

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – III (Semester – V) (W.E.F. June 2017)

Subject Name: Next Generation Application Development – MCA504(D)

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Description: This course teaches how to build a simple iOS app in iOS 7 from concept to release. Its approach is based on my personal experience of creating my first iOS app. You start with an idea for an app called Bands that gets fleshed out into a set of features. You then learn about Objective-C and the design concepts that are the foundation of Cocoa Touch and the iOS SDK. From there you start to build the Bands app by progressively building the project from what is essentially a "Hello World" app to a final app that includes all features you can find in many popular iOS apps

Course Objectives: It's for current iOS developers who would like to learn some of the technologies included in newer releases of iOS and Xcode such as storyboards,auto layout, and local search.

Pre-requisites: Knowledge of object oriented programming

Detailed Syllabus

Unit 1 **Getting Started**: Scoping the App,Defining the Features,Creating a Development Plan (Using Swift) **20%**

starting a new app: Creating a New App in Xcode, Adding a Label to a Storyboard, Running in the Simulator, Learning About Auto Layout, Exploring Application Settings, Running on a Device

Unit 2 **Creating a user input Form:** Introducing the Band Model Object, Building an Interactive User Interface, Saving and Retrieving Data **20%**

Using table views: Exploring Table Views, Implementing the Bands Data Source, Implementing Sections and Index, Editing Table Data

Unit 3 **Integrating the Camera and photo library in ios apps:** Adding an Image View and Gesture Recognizer, Selecting a Picture from the Photo Library, Taking a Picture with the Camera **20%**

Integrating social media: Sending E-mails and Text Messages, Simplifying Social Network Integration

Using web views: Learning About Web ViewsAdding Navigation

Exploring maps and local search: Learning About Map Views, Performing a Local Search

Unit 4

- **Getting started With Web services** **20%**
  - Learning About Web Services
  - Exploring the iTunes Search API
  - Discussing JSON
  - Adding the Search View

- Introducing NSURLSession
- Creating and Scheduling a Data Tas
- Parsing JSON
- Displaying Search Results
- Previewing Tracks
- Showing Tracks in iTunes

Unit 5 • **Deploying your ios app** **20%**

- Deploying the App to Beta Testers
- Registering Beta Devices
- Generating Digital Certificates
- Creating an App ID and Ad Hoc Provisioning Profile
- Signing and Deploying an Ad Hoc Build
- Submitting the App to Apple
- Exploring iTunes Connect
- Creating an App Store Provisioning Profile
- Validating and Submitting an App

Text Book :

"Beginning iOS Programming - Building and Deploying iOS Applications", **Publisher:** Wrox, **By:** Nick Harris

Reference Books :

- Programming iOS 7
- iOS 7 Programming Cookbook
- iOS 7 Programming Fundamental

Unit wise coverage from Text Book

- Unit 1: Chapter -1,2,3
- Unit 2: Chapter-4,5
- Unit 3: Chapter-6,7,8,9
- Unit 4: Chapter 10
- Unit 5: Chapter – 12

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – III (Semester – V) (W.E.F. June 2017)

Subject Name: Industrial Project-I - MCA-505

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Pr.	Th.	Pr.	
4	0	8	0	50	0	200	250

Rationale (Course Objective) :

The students would be developing a Client Server application which will enable them to use the concepts of system development and analysis. More focus would be on requirement analysis, preparation of SRS, design consideration and design documentation, translation of design to prototypes, implementation and review of prototypes.

Learning Outcome:

At the end of the project students will be able to understand the importance of system analysis and design in implementation of a project, which would be of great help in developing a real time project in the later semesters.

Instructional Strategies:

Theory sessions for mini project -1 would acquaint students with the basic concepts of developing a project. Also practical sessions allotted for mini project -1 would ensure that the students undergo sincere work under the guidance of faculty members.

Criteria for Evaluation of Software Projects

Project Definition:	10%
Related project Study Analysis:	30 %
Design& Development:	40%
Implementation & Testing:	20%

Practical: Visual Studio, JDK, or any other tool (as applicable) will be used for practical programs

Kadi Sarva Vishwavidyalaya

Master of Computer Application (MCA)

Year – III (Semester – VI) (W.E.F. Dec 2015)

Subject Name: Industrial Project-II - MCA-601

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Pr.	Th.	Pr.	
24	16 Week (48 Hrs at Industry Side per week)		-	300	-	500	800

Rationale (Course Objective) :

The students would be developing a live project which will enable them to use the concepts of Software Project Management and Software Engineering. More focus would be on Risk analysis, Planning & Monitoring, Defect Removal and most importantly Quality Assurance.

Learning Outcome:
Students will come out as complete Software Engineer who will be ready to work in the Industry Atmosphere and its deadlines

Instructional Strategies:
This is a full time live project so the students will undergo sincere work under the guidance of faculty members as internal guides as well as external guides from the industry. Regular feedbacks and presentations will be conducted.

Practical: Visual Studio, JDK, Android SDK, SDK for windows phone or any other tool (as applicable) will be used for practical programs

Internal: Continuous Evaluation Components (CEC) (300 Marks) [IA+IB+IC+ID=CEC] :[30+90+120+60=300]

Project Definition IA (30 Marks)		Related project Study Analysis IB (90 Marks)			Design and Development IC (120 Marks)				Implementation & Testing ID (60 Marks)		
Project Title	Innovative problem definition	System Flow	ERD	DFD/ UML	Tools	Database	Interface	reports	Working model	Test cases	Document.
10	20	30	30	30	30	30	30	30	25	20	15

External Evaluation Components (500 Marks)

[EA+EB+EC+ED+EF=External]: [50+150+175+75+50=500]

Project Definition EA (50 Marks)	
Project theme	Innovative concept
20	30

Related project Study Analysis EB (150 marks		
Study of Systems	Analytic Findings	Proposed System
50	50	50

Design and Development of Proposed System EC (175 Marks)			
Tools Selection and uses	Data organization & Modeling	Prototyping	Documentation
25	60	30	60

Implementation & Testing ED (75 Marks)		
Working model	Test cases	Reports and Results
25	25	25

User Manual EF (50 Marks)