Kadi Sarva Vishwavidhyalaya

MCA Syllabus

(Effective from August 2018)

(Approved in BOS meeting held in 2018)

Kadi Sarva Vishwavidhyalaya

Rules & Regulations

Regulations for the Degree of

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

Kadi Sarva VishwaVidyalaya

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-

Sr. No.	Grade	Grading	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.

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

   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 2018-19										
Sr. No.	Sub. Code	Name of the subject	SUB Total CREDIT	Teaching scheme (per week)		Examination scheme				
						MID	CEC	External		Total
				Th.	Pr.	Th.	Th.	Th.	Pr.	Marks
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	50	150
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	0	100
6	MCA-106	COMMUNICATION SKILL	3	3	--	25	25	50	0	100
7	MCA-107	*Basic Presentation	1	-	2	0	50	0	0	50
		TOTAL	**24**	**18**	**12**	**150**	**200**	**300**	**150**	**800**

Note: * Presentation Skill Development

KADI SARVA VISHWA VIDYALAYA, GANDHINAGAR										
MCA SEMESTER-II SYLLABUS W.E.F. YEAR 2018-19										
Sr. No.	Sub. Code	Name of the subject	SUB Total CREDIT	Teaching scheme (per week)		Examination scheme				
						MID	CEC	External		Total
				Th.	Pr.	Th.	Th.	Th.	Pr.	Marks
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…	3	2	--	0	50	0	0	50
		TOTAL	**26**	**20**	**10**	**150**	**200**	**300**	**150**	**800**

Note: * Seminar Skill Development

KADI SARVA VISHWA VIDYALAYA, GANDHINAGAR										
MCA SEMESTER-III SYLLABUS W.E.F. YEAR 2018-19										
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	**5**	3	4	25	25	50	50	150
2	MCA-302	WEB DEVELOPMENT TECHNOLOGY	**5**	3	4	25	25	50	50	150
3	MCA-303	ADVANCED DATABASE MANAGEMENT SYSTEMS	**5**	3	4	25	25	50	50	150
4	MCA-304	ADVANCED NETWORKING	**4**	3	2	25	25	50	50	150
5	MCA-305	PROGRAMMING USING OPEN SOURCE	4	3	2	25	25	50	50	150
6	MCA-306	MINI PROJECT - I	**1**	-	2	0	50	0	0	50
		TOTAL	**24**	**15**	**18**	**125**	**175**	**250**	**250**	**800**

KADI SARVA VISHWA VIDYALAYA, GANDHINAGAR										
MCA SEMESTER-IV SYLLABUS W.E.F. YEAR 2018-19										
Sr. No.	Sub. Code	Name of the subject	SUB Total CREDIT	Teaching scheme (per week)		Examination scheme				Total Marks
						MID	CEC	External		
				Th.	Pr.	Th.	Th.	Th.	Pr.	
1	MCA-401	ADVANCED OBJECT ORIENTED TECHNOLOGY	**5**	3	4	25	25	50	50	150
2	MCA-402	OPEN SOURCE TECHNOLOGY	**5**	3	4	25	25	50	50	150
3	MCA-403	OPTIMIZATION TECHNIQUES	**3**	3	-	25	25	50	-	100
4 – 1		**ELECTIVE GROUP I: MOBILE**								
	MCA-404 (A)	MOBILE PROGRAMING	**5**	3	4	25	25	50	50	150
	MCA-405 (A)	NEXT GENERATION APPLICATION DEVELOPMENT	**5**	3	4	25	25	50	50	150
	MCA-406 (A)	MOBILE CROSS PLATFORM DEVELOPMENT	**3**	3	-	25	25	50	-	100
4 – 2		**ELECTIVE GROUP II: DATA ANALYTICS**								
	MCA-404 (B)	DATABASE ADMINISTRATION	**5**	3	4	25	25	50	50	150
	MCA-405 (B)	BIG DATA & DATA ANALYTICS	**5**	3	4	25	25	50	50	150
	MCA-406 (B)	NEXT GENERATION DATABASES	**3**	3	-	25	25	50	-	100
4 – 3		**ELECTIVE GROUP III: NETWORK**								
	MCA-404 (C)	WIRELESS SENSOR NETWORKS	**5**	3	4	25	25	50	50	150
	MCA-405 (C)	INFORMATION & NETWORK SECURITY	**5**	3	4	25	25	50	50	150
	MCA-406 (C)	HETEROGENEOUS NETWORKS	**3**	3	-	25	25	50	-	100
		TOTAL	**26**	**18**	**16**	**150**	**150**	**300**	**200**	**800**

KADI SARVA VISHWA VIDYALAYA, GANDHINAGAR										
MCA SEMESTER-V SYLLABUS W.E.F. YEAR 2018-19										
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	ARTIFICIAL INTELLIGENCE	**4**	3	2	25	25	50	50	150
2	MCA-502	CYBER SECURITY & FORENSIC SCIENCE	**4**	3	2	25	25	50	50	150
3	MCA-503	CLOUD INFRASTRUCTURE & SERVICES	**4**	4	-	25	25	50	-	100
4	MCA-504	MACHINE LEARNING	**4**	3	2	25	25	50	50	150
5	MCA-505	INTERNET OF THI NGS	**4**	3	2	25	25	50	50	150
6	MCA-506	**ELECTIVE:**								
	MCA-506 (A)	SOFTWARE TESTING & QUALITY ASSURANCE	**4**	3	2	25	25	50	50	150
	MCA-506 (B)	ADVANCED WEB DEVELOPMENT TECHNOLOGIES	**4**	3	2	25	25	50	50	150
	MCA-506 (C)	DIGITAL MARKETING	**4**	3	2	25	25	50	50	150
	MCA-506 (D)	BLOCK CHAIN TECHNOLOGY	**4**	3	2	25	25	50	50	150
7	MCA-507	MINI PROJECT – II	**2**	-	4	0	25	0	25	50
		TOTAL	**26**	**19**	**14**	**150**	**175**	**300**	**275**	**900**

KADI SARVA VISHWA VIDYALAYA, GANDHINAGAR										
MCA SEMESTER-VI SYLLABUS W.E.F. YEAR 2018-19										
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-601	INDUSTRY PROJECT	**24**	16 Week (48 Hrs at Industry Side per week)		0	200	0	500	**700**

Kadi Sarva Vishwavidhyalaya

Syllabus

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester I
MCA - 101: Programming for Logic Building

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, Gandhinagar
MCA Semester I
MCA - 102 : Internet & Web Designing

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: HTML 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 – Chinese, Indian
   - Sub Category - Starter, Main Items, 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 – National, 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, Gandhinagar
MCA Semester I
MCA - 103 : Database Management System

Sub Total Credit	Teaching scheme (per week)		Examination scheme				
			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, Gandhinagar
MCA Semester I
MCA – 104 : Foundation in Mathematics

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, Gandhinagar
MCA Semester I
MCA - 105 : Computer System Architecture

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, 6th 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, Gandhinagar
MCA Semester I
MCA - 106 : Communication Skill

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, Gandhinagar
MCA Semester II
MCA - 107 : Basic Presentation

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
1	-	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:
Sessions would acquaint students with the basic concepts of preparing a presentation utilizing the concepts of presentation skills.

Basic Presentation Topics:
The topics include –
Computer Peripherals, Networking, Social Networking, Google Search, Search Engine Optimization and any other related to Computer Science. Also if students are interested in topics other than Computer Science, they can give presentations.

Criteria for Evaluation of Presentations
Content : 20%
Use of Presentation Tools : 30%
Presentation Skills : 50 %

SEMESTER – II

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester II
MCA - 201 : Data & File Structures

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, Gandhinagar
MCA Semester II
MCA - 202 : Operating System

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

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 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, Inter Process 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, Gandhinagar
MCA Semester II
MCA - 203 : Object Oriented Concepts & Programming

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

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, Gandhinagar
MCA Semester II
MCA-204:Computer Oriented Numerical & Statistical Methods

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, Gandhinagar
MCA Semester II
MCA - 205:System Analysis & Design and Software Engineering

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, Gandhinagar
MCA Semester II
MCA - 206 : Foundation in Networking

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, Gandhinagar
MCA Semester II
MCA - 207 : Seminar

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	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 %

SEMESTER – III

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester III
MCA 301:Object Oriented Technology

Rationale:

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.

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

Learning Outcomes:

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

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test,
Regular Attendance, etc.

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 Contents:

UNIT – I : JAVA FUNDAMENTALS [20%]

Java's magic : The Bytecode, A First Simple Program, Lexical Issues, Difference between object- oriented programming language and object-based programming language.Data Types, Variables, Arrays ,Wrapper Classes, java.util classes: Date, Calander, Math, Scanner , Operator, Operator Precedence, Using Parenthesis, Control Statements

UNIT – II : OOPS CONCEPTS **[20%]**

Class FundamentalsDeclaring objects, Introducing methods, Constructors, The this keyword, Garbage collection, The finalize() method, Overloading methods, Understanding static, Introducing final, Using command line arguments Inheritance Basics, Using super, Method overriding, Dynamic Method Dispatch, Using Abstract Classes

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

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.

UNIT – III : INPUT OUTPUT AND STRING **[20%]**

INPUT OUTPUT

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

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%]**

SYNCHRONIZATION IN MULTITHREADED PROGRAMMING

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

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.

UNIT – V **[20%]**

SWING FRAMEWORK

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.

ANNOTATION IN JAVA

What is Annotations,where we can use annotations? built-in annotations in java.

Text Book(s):

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

Unit wise Coverage from Text book(s):

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

Note: Practicals of Unit 1 should be developed using command prompt and Unit 2 onwards IDE like Eclipse or NetBeans can be used

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, Gandhinagar
MCA Semester III
MCA - 302: Web Development Technology

Rationale:

- To develop basic knowledge of designing and developing client server architecture based web applications using Asp.Net with C#
- This course covers advanced topic in ASP.NET, so that student can develop any web based projects for the industry.

Prerequisites: HTML, Client-side scripting, Basic Asp.Net

Learning Outcome:

This Course Covers learning and implementation of -

- Web Application Architecture
- Server Controls, HTML Controls & CSS
- Master pages & Themes
- Working With AJAX
- Working With Database
- Securing Web Application
- ASP.NET Web Services

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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 Contents:

Unit 1: Introduction to Client Server Architecture & Asp.Net Basics (20%)

Introduction to .NET Framework: NET framework, Namespaces, Assemblies.
An Introduction to ASP.NET: Understanding HTML, A First Look at ASP.NET Markup
A Tour of the IDE: The Main Development Area, Informational Windows
Building an ASP.NET Web Site: Creating Web Sites, Working with Files in Your Web Site, Working with Web Forms.

Designing Your Web Pages: An Introduction to CSS, Working with CSS in Visual Web Developer

Unit 2: Working with ASP.NET Controls & Programming (20%)

Introduction to Server Controls: A Closer Look at ASP.NET Server Controls, Types of Controls, ASP.NET State Engine
Introduction to Programming: Data Types and Variables, Statements, Organizing Code.
Creating Consistent Looking Web Sites: Consistent Page Layout with Master Pages, Using a Centralized Base Page, Themes, Skins

Unit 3: **Advanced Controls (20%)**

Navigation: Using the Navigation Controls
User Controls: Introduction to User Controls, Adding Logic to Your User Controls,
Validating User Input: Gathering Data from the User, Processing Data at the Server,
ASP.NET AJAX: Using ASP.NET AJAX in Your Projects

Unit 4: Introduction to Databases (20%)

Databases: Using SQL to Work with Database Data, Creating Your Own Tables
Displaying and Updating Data: Data Controls, Data Source and Data-Bound Controls Working Together, Customizing the Appearance of the Data Controls, Updating and Inserting Data
LINQ: Introducing LINQ, Introducing LINQ to SQL

Unit 5: Presenting Data (20%)

Advanced Topics: Formatting Your Controls Using Styles, Handling Events, Caching
Security: Introducing Security, Introducing the Login Controls, Role Manager,
Exception Handling: Basics of Debugging, Tools Support for Debugging **Deploying Your Web Site:** Preparing Your Web Site for Deployment

Text Book:

- Imar Spaanjaars, Beginning ASP.NET 3.5 In C# and VB, Wrox Publication

Reference Books:

- ASP.NET 4.0 Black Book, Dreamtech Press
- Mastering Visual Basic 2008 – Evangelos Petroutsos, Wiley India.
- ASP.NET Website Programming: Programs - Design – Solution
- ASP.NET in a Nutshell
- Teach Yourself ASP.NET in 24 Hours

Practical Programs:

1. Develop a Registration page using standard controls and validation controls a.

   Use of radio button, dropdown and combo box is needed

b. Validation to be applied in every control

2. Create a Registration page and store the details in the database
3. Create a login page and change password page and update the details in the database
4. Develop an admin page, in which admin can able to a.

   Add new product details

   b. Edit product details c.

   Delete any product

   d. Display the details in the gridview
5. Display the product details in the gridview

   a. Gridview should be sorted according to the products b.

   Paging should be applied in the grisview

   c. Grid rows should be applied with alterative colors
6. Create a Master page and combine Registration, login, change password and product pages to be included in the master page. User should able to access any page simultaneously.
7. Display a gridview which displays the details from the database and allow gridview to perform edit, delete and insert through the grid.
8. Develop an application to create user profile and allow the user to update the profile. Once you get the input data from the user, the profile data to be displayed in the correct format for the user to get printout with user image.
9. Create an application form in vb.net to store user's information also validate the information to display the error message for certain criteria like:

   a. User exceeds max length b.

   If the field is blank

   c. User has entered a numeric in place of char/ vice-versa. d. If

   info is valid it should store the details in the database.

   e. Users should able to display the list of all users' residing in a particular city in a data grid

   f. User should also able to edit or to delete a particular user.
10. Implement AJAX control in Asp.Net web application
11. Use LINQ queries to access the database from Asp.Net web application.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester III

MCA-303:Advanced Database Management System

Course Description:
The primary objective of this course is to provide in-depth knowledge of the Advance concepts database management system: DDBMS, DW and back end programming through PL/SQL.

Prerequisites:
- Knowledge of centralized database management system, DBMS concepts, SQL

Learning Outcomes:
Students will learn Five components like DDBMS, Data Warehousing 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 are as under:

- In "DDBMS", they will understand concepts like distributed database processing, DDBMS architecture, Distributed database design, overview of query optimization and overview of transaction control in DDBMS.
- In "Data Warehousing", they will understand concepts like DW architectures, important components, multidimensional, OLAP operations and enhancement of Group by clause in SQL for OLAP operations.
- In "PL/SQL", they will understand three tire client/server application models and need of
- PL/SQL.
- In "Basic features of PL/SQL" they will practice and implement block structure of PL/SQL, variable declaration, datatypes and operators in PL/SQL, etc.
- In "Data retrieval and Exception handling in PL/SQL" they will practice and implement how
- to retrieve data using cursor and how errors are handled in PL/SQL.
- In "Creating and managing named PL/SQL blocks" they will practice and implement how to
- create and use Procedures, Functions, Packages and Triggers.
- In "Advanced features in PL/SQL" they will practice and implement how to create and
- manage bulk binds and the functionalities of dbms_SQL package.
- All these concepts are important to build their career as Back-End Developer, Database
- Programmer, and Back End API developer.

Teaching and Evaluation Scheme:
The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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 Contents:

UNIT-I : Introduction to DDBMS [20%]

What is DDBMS? -Distributed Data Processing, Defining Distributed Database System, Promises of DDBMS, Complicating Factors, and Problem Areas. DDBMS Architecture: Client/Server Systems, Peer-to-Peer Distributed System and Multi-DBMS Architecture (MDBS).Distributed Database Design: Design strategies, design issues, basics of fragmentation and allocation. Basics of Query Optimization in DDBMS, Overview of Transaction Management and Concurrency Control in DDBMS.

UNIT–II Introduction to Data Warehousing [20%]

Data Warehouse Definition with clear understanding of the four key-words appearing in it. Differences between Operational Database Systems and Data Warehouses; Difference between OLTP & OLAP. Data warehouse Architecture, Overview of Multi-dimensional Data Model (Star, Snowflakes and Fact Constellations Schema), and the basic differentiation between "Fact" and "Dimension"; OLAP Operations in Multi-dimensional Data Model: Roll-up, Drill- down, Slice & Dice, Pivot (Rotate),Type of OLAP Servers: ROLAP versus MOLAP versus HOLAP, Metadata of DW. Enhancement to Group by clause: Group by using Cube and Rollup.

UNIT-III : Introduction to PL/SQL [20%]

Why PL/SQL?, Features of PL/SQL, Application models and PL/SQL, 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.

Data retrieval using Cursor: Explicit and Implicit cursor, cursor fetch loops and cursor variables.

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

Error handling: Declaring and Handling exceptions, Raising Exceptions, The EXCEPTION_INIT pragma, Using RAISE_APPLICATION_ERROR statement, Exception propagation. Creating subprograms Procedures and Functions, Procedures versus Functions, Local subprograms and stored subprograms. Database Triggers : Types of triggers, Managing Triggers.

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

Creating Packages: Package specification and package body, Packages and Scope, Overloading packaged subprograms, Package Initialization, overview of collections.

Language Features: Native dynamic SQL, Bulk binds, Bulk COLLECT and RETURING INTO clause, DBMS_SQL package.

Text Book(s):

1. Principles of Distributed Database Systems. Ozsu and Valduriez. Prentice Hall.
2. DATA WAREHOUSING FUNDAMENTALS, PAULRAJ PONNIAH A Wiley-Interscience Publication JOHN WILEY & SONS, INC. New
3. "Oracle 9i PL/SQL Programming", Scott Urman, Oracle Press.
4. "SQL,PL/SQL The programming language of oracle", 3rd revised edition, Ivan Bayross, BPB Publication

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
5. DISTRIBUTED DATABASE MANAGEMENT SYSTEMS :A Practical Approach, by SAEED K. RAHIMI and FRANK S. HAUG, A JOHN WILEY & SONS, INC., PUBLICATION
6. Data Mining Concepts and Techniques Third Edition Jiawei Han University of Illinois at Urbana–Champaign Micheline Kamber Jian Pei Simon Fraser University

List of practical based on Designing and implementing database programming based on Case Study.

1. Design and implement star schema and snowflake schema.
2. Analytical SQL query using cube and rollup
3. Simple PL/SQL Blocks
4. PL/SQL Blocks using built-in functions
5. PL/SQL Blocks using cursors
6. PL/SQL Blocks for Error Handling
7. Stored Procedures
8. Stored Functions
9. Triggers
10. Packages and usage of in-built packages
11. Workshop based on other databases: Postgrace etc.

Unit wise coverage from text book(s):

UNIT 1: Text Book 1, Ref Book 5
UNIT2: Text Book 2, 3, Ref Book 6
UNIT3: Text Book 3
UNIT4: Text Book 3
UNIT5: Text Book 3

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester III
MCA 304:Advanced Networking

Rationale:

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

Prerequisite: Basic concepts of network communication such as ports, topologies, Categories of Networks, Physical Media, Switch, Router, Hub, Bridges, Gateway, Repeater etc.

Learning Outcomes:

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

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

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test,
Regular Attendance, etc.

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

Course content:

Unit 1: Basics of Networking **[15%]**

Categories of Networks: Local Area Network, Wide Area Network, Metropolitan Area Networks, OSI Reference Model, TCP/IP Model

Unit 2: Internet Protocols & ICMP **[25%]**

IP Addressing: IP4 and IP6, IP Address, Class full Addressing, Connectionless Datagram Delivery, Forwarding IP Datagram, Routing table,

ICMP: ICMP protocol, ICMP Message format

Unit 3: 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 4: VPN, DNS and TCP protocols **[25%]**

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 5: Internet security **[15%]**

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, Monitoring and logging

Text Book(s):

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

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.

Unit wise coverage from text book(s):

UNIT 1: Book 2 and Reference Book 1
UNIT2: Ch. 4, 6, 7, 8
UNIT3: Ch. 9, 11, 12
UNIT4: Ch. 18, 19, 22 - 27
UNIT5: Ch. 30

Practical List:

1. Write a program 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, Gandhinagar
MCA Semester III
· MCA 305: Programming using Open Source

Rationale: This course introduces core programming basics—including data types, control structures, algorithm development, and program design with functions—via the Python programming language. It also covers the fundamental principles of Object-Oriented Programming and Graphical User Interface.

Prerequisite:

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

Learning Outcomes:

Students will learn to program in interactive mode with lot of time saving in development resulting in lesser developmental cost by

- Applying decision and repetition structures in program design.
- Implementing methods and functions to improve readability of programs
- Demonstrating the use of Python lists and dictionaries
- Describing and applying object-oriented programming methodology with GUI Programming

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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 content:

Unit I: Basics of Python **[20%]**

Introduction to Python, Components of the Python language System, Using Python in interactive mode with basic operations and built-in functions, Reading input from the console, Identifiers, Variables, Assignment Statements and Expression, Named Constants, Numeric Data types and Operators. Common Python functions, Objects & Methods, String Functions, Formatting Numbers and Strings.

Unit II: Programming Basics **[20%]**

Control Flow- if, if-elif-else, for, while, break, continue, pass. Functions: Defining and Calling Functions, Functions with/without return values, Positional and keyword arguments, Passing arguments by reference values. Keyword Arguments, Default Arguments, Variable-length arguments, Scope of the Variables in a Function - Global and Local Variables. Dates and Times Functions - Creating Dates and Times, Dates Arithmetic, Modules and Packages.

Unit III: Programming Advance Features **[20%]**

Lists : List Basics, Copying Lists, Passing Lists to functions, Returning a list from a function, Searching list, Sorting list, Processing Two-Dimensional lists, Passing Two-Dimensional lists to functions. **Tuples:** Tuples, Accessing tuples, Operations, Functions. **Sets :** Accessing values in sets, Operations, Functions. **Dictionaries:** Accessing values in dictionaries, Operations, Functions.

Unit IV: Object Oriented Programming, Exceptions & Database **[20%]**

OOP in Python: Classes, 'self variable', Methods, Constructor, Inheritance, Overriding Methods, Data hiding, **Handling Exception:** try except block, Raising Exceptions, User Defined Exceptions.

Database: Database Connection, CRUD Operations.

Unit V: GUI Development **[20%]**

GUI Development: Getting started with Tkinter, Processing Events, The Widget classes, canvas, The Geometry Managers, Displaying Images, Menus, Popup Menus, Mouse, Key Events and Bindings, Standard Dialog Boxes, MVC Architecture.

Text Books:

1. Introduction to Programming Using Python, Y. Daniel Liang, Pearson Publications
2. Practical Programming - an Introduction to Computer Science Using Python by Jennifer Campbell, Paul Gries, Jason Montojo, Greg Wilson.

Reference Books:

1. Fundamentals of Programming Python by Richard L. Halterman.
2. The Quick Python Book, Vernon L. Ceder, Manning Publications
3. Python and Tkinter Programming, John E. Grayson,Manning Publications

Chapters as per Units

Unit I: Chapters 2, 3
Unit II: Chapters 4, 5, 6
Unit III: Chapters 10, 11, 14
Unit IV: Chapters 12, 13.6 – 13.9, (From Book 2 - Pg 339 – 360)
Unit V: Chapter 9

Practical List

1. Write a program that asks the user about textbook prices and reports how overpriced the textbooks are. (You may wish to read this number from the user with the input command. You can round numbers with the round command.)
2. Create a program that outputs the total cost of a lunch order. Users should be prompted to input the number of hamburgers, fries, and drinks they want and the program should print the total cost of the order. The hamburgers cost 2.00, fries cost 1.50, and drinks cost 1.00. Be creative and professional in prompting the user for the information and in displaying the output.
3. Write a Python program that prompts the user for the cost of two items to be purchased. Then prompt the user for their payment. If they enter an amount that is less than the total cost of the two items, print a message that tells them how much they still owe. Otherwise, print a message that thanks them for their payment and tells them how much change they will receive. Thoroughly test your code for all possible input.
4. Create a program which will allow the user to enter the state of two switches (either 1 (on) or 0 (off)). The program should work out if both switches are on and then output the message 'the light is on'. Otherwise, the program should output the message 'the light is off'.
5. Create a program that will keep track of items for a shopping list. The program should keep asking for

new items until nothing is entered (no input followed by enter/return key). The program should then display the full shopping list.

6. Write a program that will store the schedule for a given day for a particular TV station. The program should ask you for the name of the station and the day of the week before asking you for the name of each show and the start and stop times. Once the schedule is complete it should be displayed as a table.
7. Write a program that maps a list of words into a list of integers representing the lengths of the corresponding words.
8. Create a function with signature: integer(number) The number parameter is either a number or a string that can be converted to a number. The function should return the number as type int, rounding it if the number passed in is a float. If the conversion fails, catch the ValueError exception, and return 0. Make sure it works for both strings and literal numbers, such as 4.5,
   32, "23", and "-15.1", and that it correctly returns zero for invalid numbers like "tonsils".
9. Write a program to check whether an element „y" and „a" belongs to the tuple
   My_tuple =(„p","y"."t","h","o","n") and after Printing the result, delete the tuple.
10. Write a python program named Weather that is passed a dictionary of daily temperatures, and returns the average temperature over the Weekend for the weekly temperatures given.
11. Write a program to catch a Divide by zero exception. Add a finally block too.
12. Generalize a case study on the getting the students mark statements and analysis with exception handling.
13. If you ever find yourself buying a house, you'll want to know what your monthly payment for the loan is going to be. Write a complete program that asks for information about a loan and prints the monthly payment. The formula for computing monthly mortgage payments involves the loan amount, the total number of months involved (a value we call *n*) and the monthly interest rate (a value we call *c*). The payment formula is given by the following equation:

$$payment = loan\frac{c(1+c)^n}{(1+c)^n - 1}$$

14. Write a set of classes corresponding to the geometric shapes: cube, rectangle, cone and cylinder. Each class should have a constructor that allows for the creation of different sized objects (e.g., a cube is specified by the length of its side) and a method that return the area of the shape.
15. Write a procedure that evaluates polynomials. It should take two arguments. The first is a number x. The second is a list of coefficients ordered from highest to lowest:

$$a_n, a_{n-1}, \ldots, a_2, a_1, a_0$$

    Your procedure should return the value of the polynomial evaluated at x:

$$a_n x^n + a_{n-1} x^{n-1} + \ldots + a_2 x^2 + a_1 x + a_0$$

16. Write a python program to design simple calculator performing arithmetic functions like addition, subtraction, multiplication and division with the input given by user
17. Write a dialog style application in python that calculates compound interest.
    The amount should be automatically recalculated every time the user changes one of the variable factors, i.e., the principle, rate, or years. The years combobox should have the texts "1 year", "2 years", "3 years", and so on, so the number of years will be the combobox's current index + 1. The compound interest formula in Python is amount = principal * ((1 + (rate /100.0)) ** years). The QDoubleSpinBox class has setPrefix() and setSuffix() methods which can be used for the "$" and "%" symbols.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester III
MCA 306: Mini Project-I

Rationale:

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.

Learning Outcomes:

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

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

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:	70 %
Design & Development:	20%

SEMESTER – IV

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester IV
MCA 401: Advanced Object Oriented Technology

Rationale:
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.

Prerequisite: Basic knowledge of Object Oriented Programming Language (Core Java)

Learning Outcomes:
Students will be able to develop the database driven enterprise application using the subjects concepts.

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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 Contents:

UNIT 1 :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,Advanced features of Servlet.

UNIT 2 JDBC [20%]
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

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 MVC ARCHITECTURE AND JSTL [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. 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

UNIT 5 SPRING AND ORM [20%]

What is spring? Spring architecture, dependency injection , Aspect oriented programming, Spring Boot Framework features, spring boot configuration and sample project, SB Annotation, SB properties , Spring Boot by creating a REST Web App, Introduction to hibernate and JPA, Database with SB using JPA

Text Books:

1. Marty Hall, Larry Brown, "Core Servlets and JavaServer Pages Volume – 1", Pearson
2. Marty Hall, Larry Brown, "Core Servlets and JavaServer Pages Volume – 2", Pearson
3. Craig Walls **"**Spring Boot in Action" manning publication

Chapter & Topics –

Book 2:-

Unit 4: 7, 9

Book 1:-

Unit 1: 2, 3,4,5,6,7,8,9
Unit 2: 18,
Unit 3: 10,11,12,13
Unit 4: 14, 15

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
4. Java How To Program- Eighth Edition, Paul Deitel & Harvey Deitel, PHI Publication

Note: Practicals Can be performed using any of IDE like Eclipse or NetBeans.

Experiment List:

UNIT-1:

- Develop interest calculation application in which user will provide all information in HTMLform and that will be processed by servlet and response will be generated back to the user.
- Develop an application 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).
- Demonstrate the use of request and response headers .

UNIT-2:

- Develop a program 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
- Develop a Java application to perform the database driven operation like insert, Delete, Update and selection using PreparedStatement. To perform the above operations use the table from above exercise.
- Write a Java application to invoke a stored procedure using a CallableStatement. For this a
    - stored procedure called incrementSalary may be developed to increase all the employees salary
    - by a percentage specified in the parameter.

UNIT-3:

- Write a simple JSP page to display a simple message (It may be a simple html page).
- Write a JSP page, which uses the include directive to show its header and footer.
- Develop an application to write a "page-composite" JSP that includes other pages or passes control to another page. (Hint: Use <jsp:include> or <jsp:forward>).
- Reduce the amount of Java coding in your JSP using a JavaBean component. (Hint:Use <jsp:useBean> with the name of your bean).
- Write a JSP Page to use JSP's Page directives & JSP scripting.
- Write a JSP Page to which uses Session Tracking for online shopping.

UNIT-4:

- Write a JSP page which uses tags availabe from the standard tag library JSTL. Write a Servlet which uses the concept of Request forwarding & including external source in the current servlet context.
- Develop a JSP Page to display the personal information and result information of the student in two different tabular formats.
- Develop a JSP Page to perform database driven operations like insert, Delete, Update and selection with table named Student having fields like StudId, Name, Address, result.

UNIT-5:

- Create web application using spring boot
- Demonstrate the use of REST service using SB.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester IV
MCA 402: Open Source Technology

Rationale:
This Course guides the students to – work with core PHP and MySql, Create blog and webstie using Wordpress and develop application using Laravel framework.

- Furthermore, this course helps students in creating & handling HTML forms, Creating databases and tables and Inserting records in MySQL, Creating custom error handlers, PHP and MySQL debugging techniques, Setting & accessing cookies & session variables, Upload a file in PHP, Create the advanced PHP scripts and works with MVC architecture.

Prerequisites:

- Working knowledge of Internet and HTML, CSS, JavaScript.

Learning Outcome:

- The purpose of this course is to give students an understanding of Client/Server architecture with their application tools.
- The course provides an introduction to the development of client server technologies based web applications using PHP, MySQL, and Apache.
- The course will focus on the PHP programming language. This course also provides how to configure and use CMS and allows working with Php framework using MVC architecture.

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 Contents:

Unit 1: Introduction to PHP, Control Structures, Arrays and Functions: [20%]

Application: To understand the basics of PHP and MySql

Introducing PHP: Why PHP and MySQL
Side Scripting Overview: Static HTML, Client-Side Technology, Server-Side Scripting and Escaping from HTML
Learning PHP Syntax and Variables: PHP's Syntax, Comments, Variables, Types in PHP, Type Summary, The simple types, Output

Page No: Book 1: 3 to 18, 28 to 32, 33 to 57

Unit 2: Features of PHP [20%]

Application: To understand the major features needed to work with php applications
Php Control Structures and Functions: Boolean Expression, Branching, Looping and Using functions.

Passing Information with PHP: HTTP is Stateless; GET and POST Arguments, Formatting Form Variables.
String Handling: Strings in Php, String Functions
Learning Arrays: Php Arrays, Creating arrays, Retrieving values, multidimensional arrays, inspecting arrays, deleting arrays
Number Handing: Numerical types, Mathematical operators, mathematical functions

Page No: Book 1: 59 to 140, 153 to 159

Unit 3: MySQL Database Integration and Query Processing and Web Forms: [20%]
Application: To understand and implement MySql database with Php

Introducing Database and MySQL: 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, Self-Submission, Editing Data with an HTML Form

Page No: Book 1: 185 to 188, 219 to 277

Unit 4: Advanced PHP and PHP CMS: [20%]
Application: To understand and implement the concept of cookies and sessions. To create blogs and websites using WordPress

Working with Cookies and Sessions: What is a Session? How Session works in PHP, Session Functions, Cookies.
Exception with PHP: Error Handling in PHP.
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.

Page No: Book 1: 409 to 427
Book 2: 1 to 171

Unit 5: PHP Framework: [20%]
Application: To learn and implement php framework using Laravel
Laravel – What is Laravel? Installation
Quick start: Creating your first web application: Database configuration, Creating the users table using migrations, Creating an Eloquent user model, Routing to a closure, Creating users with Eloquent, The users controller, Creating the users index view, Passing data from a controller to a view, Adding our dynamic content to the view, RESTful controllers, Creating a form for adding users, Routing POST requests to a controller action, Receiving form input and saving to the database, Creating links with the HTML helper, Deleting user records with Eloquent, Updating a user with Eloquent, Creating the update form with the form helper
Top 5 features you need to know about: Eloquent relationships, Authenticatin, Filters, Validataions, Bundles

Page No: Book – 3: 3 to 43

Text Book(s):

1. PHP 6 and MySQL 6 Bible –Steve Suehring, Tim Converse and Joyce Park – Wiley Publication
2. Beginning wordpress 3 by Stephanie Leary – APRESS Publication
3. Laravel Starter, Shawn McCool, PACKT Publication

Reference Books:

1. PHP and MySQL Web Development – Luke Welling, Laura Thomson – Pearson
2. Laraval Up & Running by Matt Stauffer – O'Reilly Publication

Practical Questions:

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 all string operations available in php
6. Write a PHP program to perform Date functions function available in php
7. Write a PHP program to perform all the Math functions available in php
8. Write a PHP Program to perform Array operations like,
    - Print the values of array.
    - Reverse an array.
    - merge two arrays in sorted manner.
    - add values of all elements of an array.
9. Write a PHP program to display current date and time and display Good Morning / Good Afternoon/ Good Evening message according to current time.
10. Create an application to create a cookie, access a cookie and destroy the cookie.
11. 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.
12. Build an authentication application and restricts the unauthorized user from loading the page. And redirect the page with appropriate message.
13. Develop an application which stores student's info with following fields rno, name, city, gender, percentage. Provide the following facilities like:
    - Search by city
    - Search by Gender
    - Display max and min percentage.
14. 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.
15. Develop an application to add the movie name currently running with following operations:
    - To see all the favorite movie
    - To view top 5 and 10movies
16. Create an application which displays the info about a particular institute which enables the user to see the faculty list according to department.
17. Create an application that keeps track of how many times a visitor has loaded the page.
18. 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>

19. Write a PHP program to calculate interest for loan using user defined class 'loancalculator'.
20. Write a program for online merchants with following operations:
    - Customer login for further transactions
    - Validates the customer's information
    - System should protect customer's information
21. Develop an application for a shopping cart with following operations:
    - Manage and display the catalog
    - Add, Update and delete the products
    - Process the shipping info
    - Stores the order info
    - Display the summary
22. 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.
23. Create a database application for social gathering containing
    - Information about the location (eg: club house, Party venue)
    - Facilities available in the venue
    - Booking for the specific events
    - Display the booking details for current month and also generate the report for the bill to be paid for a particular booking
24. Create a blog using WordPress
25. Develop CRUD implementation using Laravel

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester IV
MCA 403: Optimization Techniques

Rationale:

The primary emphasis of the course is to introduce the important optimization techniques *of* Operations Research applied in the Industry, Economy, Business, Resource Allocation, Finance, Marketing, Simulation and Network Analysis. Optimization techniques use mathematical, computational, and scientific methods for making decisions to solve real life optimization problems.

Prerequisites:

Knowledge of Computer Oriented Numerical Methods and Statistical Methods.

Learning Outcome: Students will

- Acquire adequate knowledge with mathematical and computational modeling of real decision-making problems, including the use of modeling tools and computational tools, as well as analytic skills to evaluate the problems.
- Identify and develop operational research models from the verbal description of the real system.
- Enhance knowledge of different 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.
- Gain deep knowledge of 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 and issues.
- Increase their capability to acquire sound knowledge of the algorithmic approach, real life operational issue solving approach rather than theoretical side.
- Be facilitated in such a way that they will able to use tools like MATLAB, Scilab, MS Excel, Minitab to implement and apply various optimization techniques.

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

Course Contents:

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

Introduction of Operation Research, definitions, features, advantages and applications, 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, Graphical method, Simplex method (Maximization case)

UNIT – II: Linear Programming Problem and Sequencing Problem [20%]

Simplex method (Minimization case), Two Phase Method, Big – M method , Introduction of Job Sequencing, Notation, Terminology and Assumptions, Johnson's algorithm for processing **n** jobs

through **2** machines, Johnson's algorithm for processing **n** jobs through **3** machines, Johnson's algorithm for processing **n** jobs through **m** machines, Processing **2** jobs through **m** machines using graphical method.
(Exclude: Dual Problem and Revised Simplex Methods)

UNIT – III: Transportation Problem [20%]

Introduction of Transportation problem (T.P.), Mathematical Models of T.P., Method to find initial basic feasible solution, North-West Corner Method(NWCM), Least Cost Cell Entry Method(LCM), Vogel's Approximation Method(VAM), Test of optimality for finding an optimum solution – MODI method, Variations in Transportation Problem (Unbalanced supply and demand)
(Exclude: Degeneracy resolution, Alternative Optimal Solution Prohibited transportation routes)

UNIT – IV: Assignment Problem (A.P.) [20%]

Introduction of Assignment Problem (A.P.), Mathematical Models 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 – V: Project Management (PERT and CPM) [20%]

Introduction of Project Management, basic difference between PERT and CPM, Network Concepts, Components, Rules for Network Construction, Critical Path Analysis (Forward Pass, Backward Pass, Critical Path)

Text Book(s):

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

Other Reference Books:

1. Operations Research :
   Author(s): M.V. Durga Prasad
   Publication: Cengage Learning India Pvt. Ltd.
2. Operations Research – Principles and Practice :
   Author(s): Pradeep Prabhakar Pai
   Publication: Oxford Univercity Press
3. Operations Research – Problems & Solutions :
   Author(s): V. K. Kapur
   Publication: Sultan Chand & Sons, New Delhi
4. Operations Research :
   Author(s): Kanti Swarup, Gupta P.K. , Man Mohan
   Publication: Sultan Chand & Sons, New Delhi
5. Operations Research :
   Author(s): N.K.Tiwari, Shishi K. Shandilya
   Publication: Prentice - Hall of India Pvt. Ltd.
6. Operations Research – An Introduction :
   Author(s): Hamdy A. Taha
   Publication: Prentice - Hall of India Pvt. Ltd.
7. Operations Research for Development :
   Author(s): Jonathan Rosenhead, Arabinda Tripathy
   Publication: New Age International Pvt. Ltd.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester IV
MCA404 (A) : Mobile Programming

Rationale:
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.

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

Learning Outcomes:
At the end of this course, student will be able:

- to understand the process of developing software for the mobile
- to create mobile applications on the Android Platform
- to create mobile applications involving data storage in SQLite database.

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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 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):

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

Practical List

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
   - Create sample application with login module.(Check username and password)
   - On successful login, go to next screen. And on failing login, alert user using Toast.
   - 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 :
   - Create spinner with strings taken from resource folder(res >> value folder).
   - On changing spinner value, change image.
6. Understand Menu option.
   - 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 :
    - Create an UI such that, one screen have list of all the types of cars.
    - 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:
    - 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, Gandhinagar
MCA Semester IV
MCA405 (A) : Next Generation Application Development

Rationale:
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/Swift 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

Prerequisites: Knowledge of object oriented programming

Learning Outcomes:
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.

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 Contents:

Unit 1 **Getting Started**: Scoping the App,Defining the Features,Creating a Development Plan

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

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

Integrating social media: Sending E-mails and Text Msges, Simplifying Social Network
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

- 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

- 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, Gandhinagar
MCA Semester IV
MCA - 406 (A) : Mobile Cross Platform Development

Rationale: 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.

Prerequisite:
Knowledge of object oriented programming, basic HTML and database concepts

Learning Outcomes:
- Set up app development studio with tools of the trade.
- Test the app on virtual and actual mobile devices.
- Write appropriate HTML5 for mobile
- Use CSS3 to create stunning mobile user interfaces..

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

Course content:
Unit I: 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 II: 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 III: 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 IV: 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 V: 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. PhoneGap Essentials, Building Cross Platform Mobile Apps, John M Wargo, Addission Wesley

Reference Books:

1. Beginning PhoneGap, Thomas Meyer,
2. PhoneGap 2.x Mobile Application Development
3. PhoneGap Mobile Application Development Cookbook
4. 20 Recipes for Programming PhoneGap, Building Mobile Applications with Java
5. Beginning PhoneGap,Mobile Web Framework for JavaScript and HTML5, Publisher: Apress, Rohit Ghatol, Yogesh Patel

Unit wise coverage from Text Book

Unit 1: Chapters 1,2
Unit 2: Chapters 3,8,9
Unit 3: Chapters 10,15, Chapter 5 from Reference Book 1
Unit 4: Chapters 17,18
Unit 5: Chapter 20, 22

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester IV
MCA - 404 (B) : Database Administration

Rationale:
The primary objective of this course is to provide in-depth knowledge of the administrative task of database management systems.

Prerequisites: Knowledge of DBMS, SQL & PL/SQL is desirable.

Learning Outcomes:
Students will learn Five components like basics of database administrations, Database user administration and security, Database backup and recovery ,Database Performance Management and data storage management, metadata management and different DBA tools at the end of this course, which are as under:

- In basics of DBA they will develop as skill to install database server, understands basic roles and responsibilities of DBA along with different current DBA trends.
- In database user administration, they will be able to create users, manage them by assigning roles and privileges. And in database security they will learn different ways to handle security through user administration, stored procedure, encryption etc.
- In database backup and recovery they will be able to take database backup and recovery using DBA tools with clarity of concepts like various backup and recovery types.
- In database performance they will be able to use and analyze DBMS statists like SQL execution plan etc. and understand the concepts like system, database and application level performance tuning.
- In last section of the course they will be able to perform data pump utility for data storage movement, metadata management and different DBA tools vendors.
- All these concepts are important to build their career as Database Administrator, Data Manager, and Architecture/Data Engineers.

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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 Contents:

Unit 1 Basics of Database Administration [20%]

What Is a DBA? Why DBA?, Database, Data, and System Administration, **DBA Tasks**, The **Types of DBAs**, The Impact of Newer Technology on DBA: The Internet: From DBA to eDBA, The Personal DBA and the Cloud, NoSQL, Big Data, and the DBA, DBA Certification. **Creating the Database Environment**: Defining the Organization's DBMS Strategy, Choosing a DBMS, DBMS Architectures-ORACLE, DBMS Clustering, DBMS Proliferation, Hardware Issues, and Cloud Database Systems. **Installing the DBMS-ORACLE:** DBMS Installation Basics, Hardware Requirements, Storage Requirements, Memory Requirements, Configuring the DBMS, Connecting the DBMS to Supporting Infrastructure Software, Installation Verification, DBMS Environments, Database Standards and Procedures.

Unit 2 Database User Administration and Security [20%]

Database Security Basics : Database Users ,Granting and Revoking Authority :Types of Privileges ,Granting to PUBLIC ,Revoking Privileges ,Label-Based Access Control, Security Reporting ,Authorization Roles and Groups, Other Database Security Mechanisms, Using Views for Security ,Using Stored Procedures for Security, Encryption ,Data at Rest Encryption: Data in Transit Encryption, Encryption Techniques ,SQL Injection: Prevention ,Auditing , External Security, Job Scheduling and Security , 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), Non-DBMS DBA Security.

Unit 3 Database Backup & Recovery [20%]

The Importance of Backup and Recovery: Preparing for Problems ,Backup :Full versus Incremental Backups, Database Objects and Backups, DBMS Control, Concurrent Access Issues ,Backup Consistency , Log Archiving and Backup ,Determining Your Backup Schedule, DBMS Instance Backup ,Designing the DBMS Environment for Recovery, Alternate Approaches to Database Backup, Document Your Backup Strategy ,Database Object Definition Backups ,Recovery :Determining Recovery Options ,General Steps for Database Object Recovery, Types of Recovery ,Index Recovery ,Testing Your Recovery Plan ,Recovering a Dropped Database Object, Recovering Broken Blocks and Pages, Populating Test Databases, Alternatives to Backup and Recovery: Standby Databases, Replication , Disk Mirroring.

Unit 4 Database Performance Management [20%]

Defining Performance: A Basic Database Performance Road Map-Monitoring versus Management, Reactive versus Proactive, Types of Performance Tuning - System Tuning, Database Tuning, Application Tuning, Performance Tuning Tools. Memory Usage, Data Cache Details, "Open" Database Objects, Database Logs ,Locking and Contention, The System Catalog, Other Configuration Options, System Monitoring.

Database Performance: Techniques for Optimizing Databases, Partitioning ,Raw Partition versus File System, Indexing, Denormalization, Clustering, Interleaving Data, Free Space, Compression, File Placement and Allocation, Page Size (Block Size) ,Database Reorganization, Determining When to Reorganize, Automation.

Application Performance: Designing Applications for Relational Access -Relational Optimization, CPU and I/O Costs ,Database Statistics-Query Analysis, Joins ,Access Path Choices Additional Optimization Considerations ,View Access ,Query Rewrite, Rule-Based Optimization, Reviewing Access Paths, Forcing Access Paths, SQL Coding and Tuning for Efficiency, A Dozen SQL Rules of Thumb, Additional SQL Tuning Tips, Identifying Poorly Performing SQL.

Unit 5 Data Storage Management, Metadata Management & DBA Tools [20%]

Storage Management Basics: Files and Data Sets, File Placement on Disk ,Raw Partitions versus File Systems, Temporary Database Files ,Space Management ,Data Page Layouts ,Index Page Layouts, Transaction Logs, Fragmentation and Storage ,Storage Options, Storage Area Networks, Data Movement and Distribution using Export and Import data pump utility.

Metadata Management: What Is Metadata?, From Data to Knowledge and Beyond ,Metadata Strategy, Data Warehousing and Metadata ,Types of Metadata ,Repositories and Data Dictionaries ,Repository Benefits, Repository Challenges, Data Dictionaries

DBA Tools: Types and Benefits of DBA Tools, Native DBA Tools, Evaluating DBA Tool Vendors.

Text Books:

1. Database Administration The Complete Guide to DBA Practices and Procedures, Second Edition Craig S. Mullins, Addision Wesley.
2. Kevin Loney, Bob Bryla, "Oracle 10g/11g, DBA Handbook", Oracle Press, TMGH Publications Ramesh Elmasari, Shamkant B. Navathe, "Fundamentals of Database Systems", Pearson Education, 5th Edition

Reference Books:

1. Oracle 10g/11g/onwards 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

Unit wise coverage from text book(s):

UNIT 1: Book 1 Chp. 1, 2
UNIT 2: Book 1 Chp. 14
UNIT 3: Book 1 Chp. 16
UNIT 4: Book 1 Chp. . 9,10,11,12
UNIT 5: Book 1 Chp. 18,19(pg 662), 22(pg 685-695),23(pg 699,728,729)

Practical List

1. Installation of Software
2. Create database using Oracle Configuration Assistant
3. Predefined Administrative Accounts Predefined
   Non-Administrative User Accounts Predefined
   Sample Schema User Accounts
   a. Create User, Roles, Grant different objects and system privileges to users. Grant different roles to users.

4. Managing Table space
    a. Creating a Table space
    b. Modifying a Table space
    c. Dropping a Table space
    d. Reclaiming Unused Space
5. Add, Move, and Resize, Datafiles in different table spaces.
6. Managing Rollback Segments
7. Work on different backup & recovery options
8. Work on different Import/Export options.
9. Work of at least 5 tuning options.
    a. Use of auto trace
    b. Explain plan
    c. SQL Tuning Advisory
    d. Use Of Indexing
10. Workshop of DBA based on latest trends.

Note:

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

2. For Practical Book#2

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester IV
MCA - 405 (B) : Big Data and Data Analytics

Rationale:
The course provides a deep dive into Big Data Analytics, by giving the fundamental knowledge of the concepts of big data and provides an advanced practical based learning that allows students to lead and develop in Big Data Analytical projects

Prerequisites: Knowledge of Database Management Systems, Object Oriented Programming & Basic statistics

Learning Outcomes:

- This course will teach how to program in R and use R for effective data analysis.
- The students will learn how to install and configure R necessary for an analytics programming environment and gain basic analytic skills via this high-level analytical language.
- The course covers fundamental knowledge in R programming.
- Students can able to visualize the output in different graphical format
- Popular R packages for data science will be introduced as working examples.

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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 Contents:

Unit 1: The Fundamentals of Big Data [20%]

Application: To understand big data concepts, big data adoption, planning and business intelligence

Understanding Big Data: Concepts and Terminology, Big data characteristics, Different Types of Data

Business Motivations and Drivers for Big Data Adoption: Marketplace Dynamics, Business Architecture, Business Process Management, Information and Communication Technology, Internet of Everything (IoE)

Big Data Adoption and Planning Considerations: Organization Prerequisites, Data Procurement, Privacy, Security, Provenance, Limited Realtime Support, Distinct Performance Challenges, Distinct Governance Requirements, Distinct Methodology, Clouds, Big Data Analytics Lifecycle
Enterprise Technologies and Big Data Business Intelligence: OLTP, OLAP, ETL, Data Warehouse, Data Marts, Traditional BI, Big Data BI

Page No: Book – 1: 3 to 20, 29 to 42, 47 to 69, 77 to 87

Unit 2: Introduction and Features of R Language [20%]

Application: To start installing and learn to work with R and RStudio

What is R? Installing R, Choosing an IDE, Your First Program, How to Get Help in R, Installing Extra Related Software
Scientific Calculator: Mathematical Operations and Vectors, Assigning Variables, Special Numbers, Logical Vectors
Inspecting Variables: Classes, Different Types of Numbers, Other Common Classes, Checking and Changing Classes, Examining Variables, Workspace
Vectors, Matrices and Arrays: Vectors, Matrices and Arrays
Lists and Data Frames: Lists, NULL, Pairlists, Data Frames

Page No: Book – 2: 2 to 77

Unit 3: Control Flow, Looping, Package, Data Time [20%]

Application: To implement the control flow and looping structure involved in R, to understand and implement different packages and work with date and time

Environments and Functions: Environments, Functions
Strings and Factors: Strings, Factors
Flow Control and Loop: Flow controls, Loops, **Advanced Looping:** Replication, Looping over Lists, Looping Over Arrays, Multiple-Input Apply, Split-Apply-Combine, The plyr Package
Packages: Loading Packages, Installing Packages, Maintaining Packages

Page No: Book – 2: 79 to 150

Unit 4: Working with Date & Time and Data Analysis Workflow [20%]

Application: Working with date time, different set of data and applying cleaning and transformation of data

Dates and Times: Date and Time Classes, Conversion to and from Strings, Time Zones, Arithmetic with Dates and Times, Lubridate
Getting Data: Built-in Datasets, Reading Text Files, Reading Binary Files, Web Data, Accessing Databases
Cleaning and Transforming: Cleaning Strings, Manipulating Data Frames, Sorting, Functional Programming

Page No: Book – 2: 153 to 202

Unit 5: Graphics, Model Creation and Comparison [20%]

Application: To explore and visualize the derived output in different graph format and understanding the graphs, implementation of different distribution and modeling using programming structure

Exploring and Visualizing: Summary Statistics, the Three Plotting Systems, Scatterplots, Line Plots, Histograms, Box Plots, Bar Charts, Other Plotting Packages and Systems
Distributions and Modeling: Random Numbers, Distributions, Formulae, First Model: Linear Regressions, Other Model Types
Programming: Messages, Warnings and Errors, Error Handling, Debugging, Testing

Page No: Book – 2: 207 to 298

Text Book

1. Big Data Fundamentals Concepts, Drivers & Techniques, Thomas Erl, Wajid Khattak, and Paul Buhler, Prentice Hall, Pearson publication
2. Learning R, Richard Cotton, O'Reilly Publications

Reference Books:

- A Learning Guide to R Beginner to intermediate skills in data analysis, visualization, and manipulation, Remko Duursma, Jeff Powell & Glenn Stone
- R Programming for Data Science, Roger D. Peng, Lean Publishing
- R for Beginners, Emmanuel Paradis
- http://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf
- The Art of R Programming, Norman Matloff
- Big Data Analytics with R and Hadoop, Vignesh Prajapati, PACKT Publication

Practical Questions:

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. 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
    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.
9. Create a matrix of 3 x 3 and make layout, and print the data in the layout.
10. 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?
11. 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
12. Use the lattice library and display the graphical image of all lattice form
13. Generate the .csv file, create different models and specify the,
    a. Summary of different models
    b. Find the residual, co-efficient, fitted and AIC.
14. Write a R function to calculate the Fibonacci series.
15. Write the R code to predict whether loan to be sanctioned or not to be sanctioned for a particular customer.
    a. Prepare the dataset of list of customers with their personal data, salary details, previous loan taken, EMI details per month, bank account details.
    b. Based on the input criteria predict whether loan to be given or not.
    c. If sanctioned mention the loan amount that got sanctioned
    d. Prepare a separate file and store the output details
    e. Display the current years currents loan status in a graph

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester IV
MCA - 406 (B) : Next Generation Databases

Rationale: The primary objective of this course is to provide in-depth knowledge of the next generation databases and future database technologies from SQL to NoSQL to NewSQL, different databases like document, graph, columnar databases etc.

Prerequisite: Knowledge of DBMS, ADBM, SQL & PL/SQL is desirable.

Learning Outcomes:
Students will learn seven concepts like database revolution, Document Databases, Graph Databases, Column Databases, In-Memory Databases, Object Databases, and Databases of Future. At the end of this course, they will enhance their conceptual and analytical understanding as under:

- In database revolution they will understand the first, second and third revolution of databases from file base databases to SQL to NoSQL to NewSQL.
- In document databases, they will be able to understand the document database overview, NoSQL databases, overview of MongoDB and CouchDB.
- In Graph and Column databases, they will be able to understand the graph and column databases overview and overview of Neo4j , Gremlin, Sybase IQ, C-Store, and Vertica.
- In Memory and Object databases, they will be able to understand features of in-memory databases and object databases overview and overview of TimesTen , Redis , SAP HANA, VoltDB , Oracle 12c, SPARK architectures.
- In last section of the course they will be able to make them understands about future database technologies like storage, block chain and quantum computing.
- All these concepts are important to build their career as Data Architecture/Data Engineers, Data Scientist, Data Analyst and DBAs.

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

Course content:

Unit 1 Database Revolution [20%]

Three Database Revolutions, Early Database Systems-The First Database Revolution, The Second Database Revolution- Relational theory, Transaction Models, The First Relational Databases, Client-server Computing, Object-oriented Programming and the OODBMS, The Relational Plateau, The Third Database Revolution, Google and Hadoop, The Rest of the Web, Cloud Computing, Document Database, The "NewSQL", The Nonrelational Explosion. Google, Big Data, and Hadoop, The Big Data Revolution- Cloud, Mobile, Social, and Big Data, Google: Pioneer of Big Data, Google Hardware,The Google Software Stack , More about MapReduce, Hadoop: Open-Source Google Stack -Hadoop's Origins, The Power of Hadoop, Hadoop's Architecture, HBase ,Hive, Pig , The Hadoop Ecosystem.

Unit 2 Document Databases [20%] What is a document database, NoSQL databases, Why choose NoSQL?, Performance overview of different databases, Why a document store, How does it work, Data storage ,Data querying and the map/reduce paradigm ,Inserting and Modifying, ACID , The different solutions -Open source solution ,Proprietary solution. Examples - CouchDB, Why CouchDB , The storage, concurrency, Managing the database, Querying the database, Specificity of Couch DB.

Examples - MongoDB, Why MongoDB?, The storage, concurrency, Managing the database, Querying the database, Specificity of Mongo DB.

Unit 3 Graph Databases & Column Databases [20%]

What is a Graph? , RDBMS Patterns for Graphs, RDF and SPARQL, Property Graphs and Neo4j , Gremlin, Graph Database Internals, Graph Compute Engines. What is Column Databases, Why it used? The Columnar Alternative - Columnar Compression, Columnar Write Penalty, Sybase IQ, C-Store, and Vertica, Column Database Architectures -Projections, Columnar Technology in Other Databases.

Unit 4 In-Memory Databases & Object Databases [20%]

What is In-Memory Databases?, The End of Disk? -Solid State Disk , The Economics of Disk ,SSD-Enabled Databases, In-Memory Databases-Examples : TimesTen , Redis , SAP HANA ,VoltDB , Oracle 12c "in-Memory Database", Berkeley Analytics Data Stack and Spark , Spark Architecture. Overview of object databases, Object Oriented Database, Object Relational Database, mapping of object relational mapping and standards of ODBMS, Examples -ObjectDB, ObjectStore, ObjectivityDB, db4o and GemStone features and advantages.

Unit 5 Databases of Future [20%]

The revolution revisited, counterrevolutionaries-have we come full circle?, can we have it all?-consistency models, schema, database languages, storage, a vision for a converged database, other convergent databases, Disruptive database technologies-storage technologies, Blockchain-What it is?, Understanding Technologies, When it is used?, Quantum computing-Quantum Transaction, Quantum Search, Quantum Query Language.

Text Books:

1. Next Generation Databases – NoSQL, NewSQL and Bigdta, Guy Harrison, Apress.
2. CouchDB, Document oriented Databases,Alain Issa, François Schiltz,ULB
3. Document stores and MongoDB, Kaïs Albichari , Tanguy d'Hose, ULB
4. MongoDB Architecture Guide, MongoDB university, white paper
5. Graph Databases-neo4j, Ian Robinson,Jim Webber & Emil Eifrem, 2nd edition ,Oreilly

6. The Design and Implementation of Modern Column-Oriented Database Systems, Daniel Abadi, Foundations and Trends in Databases Vol. 5, No. 3 (2012) 197–280, 2013
7. http://justinlevandoski.org/papers/fnt-mmdb.pdf
8. Oracle® Database,Database In-Memory Guide,12c Release, Lance Ashdown, Oracle Press
9. Fundamentals of Object Databases: Object-Oriented and Object-Relational Design,SuzanneW. Dietrich and Susan D. Urban, Morgan & cLaypool publishers
10. Blockchain basics, Technical Introduction in 25 Steps,Daniel Drescher, Apress

Web References:

1. couchdb.apache.org
2. CouchDB: The Definitive Guide:guide.couchdb.org/
3. Amazon DynamoDB vs. CouchDB vs. MongoDB Comparison
4. https://db-engines.com/en/system/Amazon+DynamoDB%3BCouchDB%3BMongoDB
5. https://university.mongodb.com/
6. https://pdfs.semanticscholar.org/f511/7084ca43e888fb3e17ab0f0e684cced0f8fd.pdf
7. http://asiandatascience.com/wp-content/uploads/2017/12/Definitive-Guide-Graph-Databases-for-RDBMS-Developer.pdf
8. http://www.durusau.net/localcopy/Graph-Modeling-Do.s-and-Don.ts.pdf
9. https://www.jugdo.de/wp-content/uploads/2014/01/intro_to_neo4j_jugdo.pdf
10. http://nms.csail.mit.edu/~stavros/pubs/tutorial2009-column_stores.pdf

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester IV
MCA - 404 (C) : Wireless Sensor Networks

Rationale: 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).

Prerequisite:
Knowledge of Knowledge of Wireless Networks, Protocols, Transmission Media, Computer Network Operating Systems

Learning Outcomes:
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.

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 content:

UNIT- I: Overview of Wireless Sensor Networks & Technology [10%]

- 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 [20%]

- MAC Protocols for WSNs
    - Schedule-Based Protocols
    - Random Access-Based Protocols
- IEEE 802.15.4 LR-WPANs Standard Case Study - PHY Layer & MAC Layer
- Routing Challenges and Design Issues

- Network Scale and Time-Varying Characteristics
- Resource Constraints
- Sensor Applications Data Models

UNIT-III: Routing Strategies **[25%]**

- 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 **[25%]**

- 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 System **[20%]**

- Middleware - MiLAN (Middleware Linking Applications and Networks) & Impala
- Management
    a. Network Management Requirements
    b. Network Management Models
    c. Network Management Design Issues
- Operating Systems – TinyOS & 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
MCA Semester IV
MCA - 405 (C) : Information & Network Security

Rationale:

- 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.

Prerequisites: Knowledge of Networks, OSI and TCP/IP Model

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.

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 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 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, Gandhinagar
MCA Semester IV
MCA - 406 (C) : Heterogeneous Networks

Rationale: 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).

Prerequisite:
Knowledge of Knowledge of Wireless Networks, Protocols, Transmission Media, Computer Network Operating Systems

Learning Outcomes:
Students will learn following aspects:

1. They will learn about basic concepts of HetNets
2. They will learn concepts of protocols used in HetNets.
3. They will learn various Mobile Technologies and their protocols

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

Course content:

UNIT- I: Introduction and overview of Heterogeneous Networks [25%]

- 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-II: Multi-tier Network Architecture **[25%]**

- 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 **[10%]**

- 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.

Text Book:

1. Heterogeneous Cellular Networks. – Rose Qing Hu, Yi Qian – Wiley Publication, IEE Press

Reference Books:

1. Heterogeneous Cellular Networks – Theory, Simulation and Deployment, By: Xiaoli Chu, David Lopez- Perez, Yang Yang, Fedrik Gunnarsson - Cambridge University Press.
2. Heterogeneous Wireless Access Networks – Ekram Hossain – Springer.

SEMESTER – V

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester V
MCA 501 : Artificial Intelligence

Rationale:
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.

Prerequisite: Basic knowledge of Object Oriented Programming Language (Core Java)

Learning Outcomes:
On completion of this subject the student is expected to:

1. Identify problems that can be solved by search, and create search-based solution algorithms
2. Design intelligent agents
3. Choose the best search-based solving methods for a particular problem
4. Make use of formal approaches for representing and reasoning about knowledge
5. Build systems that use simple learning approaches to improve their performance

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

Course Contents:

UNIT 1: INTRODUCTION TO ARTIFICIAL INTELLIGENCE [20%]
Artificial Intelligence: What is AI? Foundations of AI, Applications;

Problem Solving: Production Systems, State Space Search, Heuristic Search Techniques – Branch & Bound Search, Hill Climbing, Breadth First Search, A* Algorithm

UNIT 2: KNOWLEDGE REPRESENTATION & LOGIC CONCEPTS [25%]
Knowledge Representation Schemes: Semantic Networks, Frames, Scripts, Proposition and Predicate Logic, Rule Based Systems

Logic Concepts: Logical Study of Valid and Sound Arguments, Non-Logical Operators, Syntax of Propositional Logic, Semantics/Meaning in Propositional Logic, Interpretations of Formulas, Validity and Inconsistency of Propositions, Equivalent forms in the Prepositional Logic (PL), Normal Forms,

Syntax of First order Predicate Logic, Prenex Normal Form (PNF), (Skolem) Standard Form, Applications of FOPL

UNIT 3: NATURAL LANGUAGE PROCESSING [20 %]

Natural Language Processing: Sentence Analysis – Morphological, Syntactical, Semantic, Pragmatic and Discourse Analysis; Decision Trees, State Machines, Grammars & Parsers, Top down Parsing, Bottom up Parsing

UNIT 4: EXPERT SYSTEMS & INTELLIGENT AGENTS [20 %]

Expert Systems: Expert System Architecture, Expert System Shells, Examples of Expert Systems

Intelligent Agents: Classification of Agents, Working of an Agent, Task Environment of Agents (PEAS), Structure of Agents

UNIT 5: FUZZY SYSTEMS [15%]

Fuzzy Systems: Fuzzy Systems, Relations on Fuzzy Sets, Operations on Fuzzy Sets, Operations Unique to Fuzzy Sets

Text Books:

1. Artificial Intelligence by Saroj Kaushik, Cengage Learning
2. Introduction to Artificial Intelligence and Expert Systems by Dan W. Patterson, PHI
3. Artificial Intelligence for Games by Ian Millington, Morgan Kaufmann Publishers

Chapter & Topics –

Unit	Book	Chapter	Topic
1	1	1 & 2	1.1 to 1.9 2.1, 2.2, 2.3, 2.5.1,2.5.2, 2.5.3, 2.5.5, 2.5.6
2	1	4, 7 & 15	4.1, 4.2, 4.3, 4.4, 4.7, 4.8 7.1, 7.2, 7.3, 7.5 15.3
3	2	12	12.1, 12.2, 12.3, 12.4
	3	5	5.2, 5.3
4	1	8 & 14	8.1, 8.2, 8.3, 8.4, 8.5.4, 8.8, 8.9 14.1, 14.3, 14.4, 14.5, 14.6, 14.7
5	1	10	10.1, 10.2, 10.3

Reference Book:

1. Artificial Intelligence by Elaine Rich, Kevin Knight and , Cengage Learning
2. Artificial Intelligence – A Modern Approach by Stuart Russell & Peter Norvig, Pearson

Experiment List: (Practical Programs are to be performed in Turbo Prolog)

1. Write a program in Prolog to show the working of Arithematic operators.
2. Write a program in Prolog to show the operations on String.
3. Write a program in Prolog explaining the domains, predicates & clauses section.

4. Write the figure 6.1 medical diagnosis program given in the Prolog book and test it for following: What is the patient's name? He is suffering from which disease?
5. Write a program in Prolog to show the working of fail predicate.
6. Write a program in Prolog to show the working of repeat predicate.
7. Write a program in Prolog to show the working of recursion without repeat predicate.
8. Write a program in Prolog to show the working of cut predicate.
9. Write a program in Prolog to show the working of cut predicate with repeat predicate.
10. Write a program in Prolog to enter inventory parts using a compound object – part (number, description, quantity, cost)

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester V
MCA 502: Cyber Security & Forensic Science

Rationale:

- 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.

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

Teaching and Evaluation Scheme: Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

Course Contents:

UNIT 1: Cybercrime and Cyber Offenses [20%]

Introduction to Cybercrime:

Definition and Origins of Cybercrime, Cybercrime and Information Security, 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, How Stalking Works? Real-Life Incident of Cyberstalking, Cybercafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Cybercrime and Cloud Computing

UNIT 2: 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: Unconventional/Stealth Storage Devices Threats through Lost and Stolen Devices, Protecting Data on Lost Devices, Educating the Laptop Users

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 3: Cybercrime Weapons [20 %]

Password Cracking: Online Attacks, Offline Attacks, Strong, Weak and Random Passwords, Random Passwords

Keyloggers and Spywares: Software Keyloggers, Hardware Keyloggers, Antikeylogger, Spywares; 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

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 4: Cyber Security & Cyber Law [20%]

Intrusion Detection: Component of intrusion detection framework, types, Function of lDS, strengths and limitations

DNS and DNS based vulnerabilities: DNS query, DNs cache, Poisoning cache, countermeasures

Email Security - PGP, S/MIME, Domain key identified mail, spam, protection against spam

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

UNIT 5: Forensics [20%]

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:

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

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 Books:

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

Chapter & Topics –

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

Reference Book:

- 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

Experiment List:

1. TCP scanning using NMAP
2. Port scanning using NMAP
3. TCP or UDP connectivity using Netcat
4. Web application testing using DVWAlCustomize web application
5. Manual SQL injection using DVWAlCustomize web application
6. XSS using DVWAlICustomize web application
7. Automated SQL injection with SqlMap
8. Vulnerability detection in Web application
9. Exploitation
10. Snort, Wiresharkuser.
11. Implement the information hiding and stegenography. (Snort).
12. Recover the deleted data and files. (recoverjpeg, recovermov, foremost)

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester V
MCA 503: Cloud Infrastructure & Services

Rationale: The Objective of this subject is

- 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

Prerequisite: Basic knowledge of Computer Networks, performance of Applications and their throughput.

Learning Outcomes:
Students will be able to understand the concept of Cloud and its working.

Teaching and Evaluation Scheme: Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
4	4	0	25	25	50	0	100

Course Contents:

UNIT 1: Introduction to Cloud Computing [20%]

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

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, 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

UNIT 2: Foundations **[20%]**

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

UNIT 3: Data Storage & Security **[20%]**

Cloud Storage: What is Cloud Storage?, Overview of Cloud Storage, Data Management for Cloud Storage, Provisioning Cloud Storage, Data-intensive Technologies for Cloud Computing

Introduction to Enterprise Data Storage, Data Storage Management, File Systems, Cloud Data stores

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, Digital Persona and Data Security, Content Level Security

Cloud Security Services: Objectives, Confidentiality, Integrity and Availability, Security authorization challenges in the Cloud

UNIT 4: Cloud Applications **[20%]**

Parallel Computing, Eras of Computing, High Performance Parallel Computing with cloud and cloud Technologies, Cloud Computing Platforms, 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

UNIT 5: Case studies & Future Cloud **[20%]**

Case Studies: Dell, Wipro, Razorfish and Japan Post

Future Trends: Emerging Future trends in Cloud Computing, Next Generation Networking (NGN)

Mobile Cloud Architecture & its Key requirements, Jungle Computing

Text Books:

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

Chapter & Topics –

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
Unit 5	33, 34, 38, 39 (39.5, 39.6.2, 39.6.4, 39.6.5)

Reference Book:

1. Cloud Computing: A practical approach by Anthony T. Vetle – Tata McGraw Hill Education Private Limited (2009)
2. OpenStack Cloud Security by Fabio Alessandro Locati, Packt Publishing
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.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester V
MCA 504: Machine Learning

Rationale:
The primary objective of this course is to provide a broad introduction to machine learning and its application.

Prerequisite: Knowledge of statistics, linear algebra, optimization, and core fundamentals of computer science to create automated systems that can sift through large volumes of data at high speed to make predictions or decisions without human intervention.

Learning Outcomes:
Students will learn seven concepts like basics of machine learning, linear regression and logistic regression, neural network representation, Decision Tree, bayes learning, support vector machine, unsupervised learning and basics of deep learning.

1. In introduction to Machine learning, they will understand the types of machine learning and its applications and basics of deep learning.
2. In linear regression and logistics regression they will understand one variable model, classification, hypothesis representation, cost function etc.
3. In neural network they will learn about perceptron learning and model representation.
4. In decision tree and bayes learning they will learn about decision tree algorithms and bayes learning techniques.
5. In unit 5 they will learn about support vector machine and unsupervised learning algorithms.
6. All these concepts are important to build their career as Machine teaching Engineers, Data Scientist and Business intelligence developers.

Teaching and Evaluation Scheme: Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

Course Contents:

UNIT1: Introduction to Machine Learning **[20%]**

Need for Machine Learning, Types of Machine Leaning: Supervised Learning, Unsupervised Learning, Reinforcement Learning, Applications of Machine Learning, Type of Data in Machine Learning, Data quality and data pre-processing, Tools in Machine Learning.

UNIT2: Modeling, Evaluation, Feature Engineering and Bayesian Concept Learning [20%]

Selecting Model, Training Model, Model Representation and interpretability, evaluating performance of a mode, improving performance of model, define feature engineering, feature transformation, feature subset selection, Bayesian theorem and concept learning.

UNIT 3: Supervised Learning: Classification and Regression [20%]

Introduction to supervised learning, its examples, classification model, classification learning steps, classification algorithms: k-nearest neighbor (kNN), Decision Tree, Random forest, Support Vector Machine (SVM), introduction to regression and its examples, Regression algorithms: simple linear regression, multiple linear regression, problems in regression analysis, logistic regression.

UNIT 4 : Unsupervised Learning : Clustering and Finding Patterns [20%]

Introduction to unsupervised learning, supervised learning vs unsupervised learning, application of unsupervised learning, clustering: types of clustering techniques, partitioning methods, k-medoid, hierarchical clustering, density based methods-DBSCAN, Finding patterns using association rules, apriori algorithm.

UNIT 5: Basics of Neural Network [20%]

Introduction, artificial neuron, types of activation functions, implementation of ANN, Architectures of Neural Network, Learning process in ANN, Active learning, Memory based learning, bootstrap aggregation (bagging) , boosting, gradient boosting machines(GBM), Introduction to Deep Learning and its need and applications.

Text Books:

1. Machine Learning, 1st Edition by Pearson (English, Paperback, Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das)
2. Sebastian Raschka, “Python Machine Learning”, PACKT publishing.

Reference Books:

1. Machine Learning, Tom Mitchell, McGraw Hill, 1997. ISBN 0070428077
2. EthemAlpaydin, "Introduction to Machine Learning", MIT Press, 2004
3. Christopher M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2006.
4. Richard O. Duda, Peter E. Hart & David G. Stork, "Pattern Classification. Second Edition", Wiley & Sons, 2001.
5. Trevor Hastie, Robert Tibshirani and Jerome Friedman, "The elements of statistical learning", Springer, 2001.
6. Richard S. Sutton and Andrew G. Barto, "Reinforcement learning: An introduction", MIT Press, 1998.

Web Material:

1. https://www.youtube.com/watch?v=fgtUFzxNztA
2. http://nptel.iitm.ac.in/video.php?courseId=1041
3. http://www-formal.stanford.edu/jmc/whatisai/whatisai.html
4. http://www.webopedia.com/TERM/A/artificial_intelligence.html
5. http://en.wikipedia.org/wiki/Artificial_intelligence

Chapter & Topics –

Unit #	Book	Chapters
Unit 1	1	1,2
Unit 2		3,4,6
Unit 3		7,8
Unit 4		9,10
Unit 5		11

Note: Practicals can be performed using Python/appropriate Open Source Tools

Practical List: (Book1, Book2)

1. Classifying with distance measures,
2. Naïve Bayes algorithm for predictability of a model

Supervised Learning -Classification Algorithms:

3. k-nearest neighbor (kNN),
4. Decision Tree,
5. Random forest,
6. Support Vector Machine (SVM),
7. Simple Linear Regression

Unsupervised Learning –Clustering Algorithms:

8. partitioning methods,
9. hierarchical clustering,
10. density based methods-DBSCAN,
11. Finding patterns using association rules, apriori algorithm
12. Procuring Cognitive Neural network
13. Training and Validation of Cognitive Neural network
14. Understanding and Classification of Brain neurons
15. Clustering of facial expressions through neurons.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester V
MCA 505 : Internet of Things

Rationale:
The primary objective of this course is to interpret the vision of IoT from a global context.

Prerequisite: Fundamentals of computer networks, wireless sensor networks, fundamental of embedded system, sensors, web technology.

Learning Outcomes:
Students will learn seven concepts like basics of internet of things.

1. Understand the concepts of Internet of Things
2. Design IoT applications in different domain and be able to analyze their performance
3. Implement basic IoT applications on embedded platform
4. All these concepts are important to build their career in broad perspective in the domain of IoT.

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

Course Contents:

UNIT1: Introduction to Internet of things [20%]

Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs, Smart Objects: Sensors and actuators (LCD, LED, PIR, IR, Ultrasonic, Temperature , humidity, pressure, gas, bluetooth, GSM,Zigbee, etc)

UNIT2: Internet of Things and M2M [20%]
IoT to M2M : A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.
IoT to M2M : An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT 3: Architecture of IoT **[20%]**

IoT Architecture -State of the Art – Introduction, State of the art, Architecture Reference Model-Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture-Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT 4: Iot Applications, Challenges, Privacy , Security and Governance **[20%]**

Introduction, IoT applications for industry: Smart Objects, Smart Applications, Value Creation from Big Data and Serialization, Home Automation, eHealth, Surveillance applications, Other IoT applications. Design challenges, Development challenges, Security challenges, other challenges, Security, Overview of Governance, Privacy and Security Issues, Data Aggregation for the IoT in Smart Cities.

UNIT 5: Developing IoTs **[20%]**

Introduction to different IoT tools, developing applications through IoT tools, developing sensor based application through embedded system platform, Implementing IoT concepts with python**.**

Text Books:

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
2. David Hanes, Rob Barton, "IoT fundamentals: networking technologies, protocols and use cases for the internet of things by pearson

Reference Books:

1. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1 st Edition, Apress Publications, 2013
2. Cuno Pfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-4493- 9357-1
3. Gastón C. Hilla, Internet of Things with Python, Packt Publication.
4. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"

Note: Practicals can be performed using Python and appropriate open source platform Practical Topics:

1. Working with LED,SWITCH
2. Interfacing LCD with Arduino
3. Interfacing PIR sensor with Arduino
4. Interfacing temperature sensor (LM35) with Arduino
5. Interfacing DHT sensor with Arduino
6. Interfacing Ultrasonic sensor with Arduino
7. Configuring Bluetooth Module using AT commands
8. Bluetooth to Bluetooth communication: Bluetooth module to mobile/computer communication
9. ZigBee to ZigBee communication
10. Configuring the NodeMCU as Wi-Fi
11. Sensor interfacing with SBC using python
    a) PIR
    b) Temperature
    c) DHT

d) Ultrasonic

List of Open Source Software/learning website:

- https://github.com/connectIOT/iottoolkit
- https://www.arduino.cc/
- http://www.zettajs.org/
- Contiki (Open source IoT operating system)
- Arduino (open source IoT project)
- IoT Toolkit (smart object API gateway service reference implementation)
- Zetta (Based on Node.js, Zetta can create IoT servers that link to various devices and sensors)

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester V
MCA 506 A : Software Testing & Quality Assurance

Rationale:
The objective of this course is to understand the basic view of software quality and quality factors, to understand the Software Quality Assurance (SQA) architecture and the details of its components and to understand of how the SQA components can be integrated into the project life cycle.

Prerequisite: Software Engineering Basics

Learning Outcome: Students will learn how to perform testing, how to develop test cases and how to assure Quality in the software.

Teaching and Evaluation Scheme: Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

Course Contents:

UNIT 1: Introduction to Software Testing [20%]

Testing as an Engineering Activity, Role of Process in Software Quality, Testing as a Process, Basic Definitions, Software Testing Principles, The Tester's Role in a Software Development Organization, Origins of Defects, Defect Classes, The Defect Repository and Test Design, Defect Examples, Developer / Tester Support for Developing a Defect Repository.

UNIT 2: Test Case Design [20%]

Introduction to Testing Design Strategies, The Smarter Tester, Test Case Design Strategies, Using Black Box Approach to Test Case Design Random Testing, Requirements based testing, positive and negative testing, Boundary Value Analysis, decision tables, Equivalence Class Partitioning state-based testing, cause- effect graphing, error guessing, compatibility testing, user documentation testing, domain testing Using White–Box Approach to Test design, Test Adequacy Criteria, static testing vs structural testing, code functional testing, Coverage and Control Flow Graphs, Covering Code Logic, Paths –Their Role in White–box Based Test Design, code complexity testing, Evaluating Test Adequacy Criteria.

UNIT 3: Levels of Testing [20%]

The need for Levels of Testing, Unit Test, Unit Test Planning, & Designing the Unit Tests. The Test Harness, Running the Unit tests and Recording results, Integration tests, Designing Integration Tests, Integration Test Planning, scenario testing, defect bash elimination, System Testing, types of system

testing, Acceptance testing, performance testing, Regression Testing, Alpha – Beta Tests – testing OO systems – usability and accessibility testing.a

UNIT 4: SQA components in the project life cycle [20%]

Software Quality and its factors, SQA Components, Integrating quality activities in the project life cycle, Reviews, Software testing – strategies and implementation, Assuring the quality of software maintenance components, Assuring the quality of external participants' contributions, CASE tools and their effect on software quality.

Procedures and work instructions, Staff training and certification, Corrective and preventive actions, Documentation control

UNIT 5: Management components of software quality, Organizing for quality assurance [20%]

Software quality metrics, Costs of software quality, Scope of quality management standards, ISO 9001, Certification, Capability Maturity Models – CMM and CMMI, Assessment methodology, Management and its role in software quality assurance, The SQA unit and other actors in the SQA system.

Text Books:

1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson education, 2006.
2. Aditya P.Mathur, "Foundations of Software Testing", Pearson Education, 2008.
3. Daniel Galin, "Software Quality Assurance", Pearson Publication, 2009

Reference Book:

- Ron Patton, "Software testing" , second edition, Pearson education, 2009.
- Boris Beizer, "Software Testing Techniques", Second Edition,Dreamtech, 2003
- Elfriede Dustin, "Effective Software Testing", First Edition, Pearson Education, 2003
- Alan C. Gillies, "Software Quality: Theory and Management", International Thomson Computer Press, 1997.
- Mordechai Ben-Menachem "Software Quality: Producing Practical Consistent Software", International Thompson Computer Press, 1997.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester V
MCA 506 B: Advanced Web Development Technologies

Rationale:
The purpose of this course is to give students an understanding of MVC architecture, implementing MVC architecture in entity framework and working with advanced databases. This course covers advanced topic in ASP.NET with JSON, AJAX, JQUERY and Web API so that student can develop any web based advanced projects for the industry.

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

Learning Outcomes:
This Course Covers -

- Developing web application using MVC Architecture
- Working with Entity Framework
- Implementing JSON, AJAX, JQUERY and Web API

Teaching and Evaluation Scheme: Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

Course Contents:

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 MVC4 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, Forms and HTML Helpers [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

Using Forms and HTML Helpers: The Action and the Method, (GET or POST), HTML Helpers, Other Input Helpers, Rendering Helpers

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

Text Book:

1. Beginning ASP.NET MVC 4, Jose Rolando Guay Paz, Apress
2. Professional ASP.NET MVC 5, Jon Galloway, Brad Wilson, K. Scott Allen, David Matson, Wrox Publication

Chapter wise coverage

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

Reference Books & Links

1. Pro Asp.Net MVC 5, Adam Freeman, Apress
2. http://www.asp.net/web-api/overview/older-versions
3. 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

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester V
MCA 506 C : Digital Marketing

Rationale:
The primary objective of this course is to provide technical and managerial skill development in area of digital marketing.

Prerequisite: Knowledge of internet, www, web site, e-commerce, m-commerce, mobile application, etc.

Learning Outcomes:
Students will learn how to use the internet as an effective marketing channel. Enables students to engage with customers online in a more practical manner and to plan and implement end-to-end lead generation through the online mode. In this course students will learn in depth concepts as listed to shape their career in digital marketing.

- Digital Marketing Introduction
- Search Engine Optimization.
- Social Media Marketing and strategies
- E-mail and mobile marketing
- Understanding Mobile and Web Analytics
- All these concepts are important to build their career as Marketing analyst, Email marketer, Digital marketer, SEO proficient, Social Media Advertiser, Content Marketer/writer.

Teaching and Evaluation Scheme: The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

Course Contents:

Unit 1: Digital Marketing Introduction [20%]

Understanding synergetic digital ecosystem: The evolution of the digital ecosystem, Data Growth Trends, digital media types, Competitive Intelligence, Click Stream, Conversion Analytics, Custom segmentation, Visual overlays, social media reporting , user experience feedback, real-time site analytics, Understanding digital analytics : Apply a measurement framework , determining your owned and earned, Demystifying web data, digital advertising concepts , searching for the right metrics, aligning digital and traditional

Unit 2: Search Engine Optimization [20%]

Introduction, key terms and concepts, on-site SEO: Optimize UX & Design, Off-Site SEO: Link-building, SEO Audit & Future of SEO, Search Engine Marketing: AdWords & key word selection, create text ads, CPC building, navigate AdWords, SEM metrics & Optimization, conversion optimization.

Unit 3: Social Media Marketing and strategies [20%]

Social media landscapes, social media channels, social media content, implement and monitor campaigns, impact measuring. Social Media Advertising (paid), platforms for social ads, create ad sets, create and manage ads, social media channels, content creation, social media strategies.

Unit 4: E-mail and mobile marketing [20%]

Introduction, e-mail strategy and planning, step by step process, create and effective email campaigns, role of mobile in personal communication, mobile messaging channels, mobile commerce, advantages and challenges.

Unit 5: Understanding Mobile and Web Analytics [20%]

Data analytics, Understanding the Basics of Search, Search Analytics Use Cases, Free Tools for Collecting Insights Through Search Data: Google Trends | YouTube Trends | The Google AdWords Keyword Tool | Yahoo! Clues , Paid Tools for Collecting Insights Through Search.

Data, Understanding the Current Mobile Market Landscape, Growth in Smartphone Adoption, The Battle Between iOS and Android, The Explosion of Global Mobile Web Traffic, The Introduction of Mobile Advertising

Text Books:

1. Digital Marketing Analytics Second Edition, Chuck Hemann, Pearson
2. eMarketing_ The Essential Guide to Digital Marketing, Rob Stokes
3. Digital Marketing Analytics: Making Sense of Consumer Data in a Digital World, chuck hemann ken burbary, QUE

Reference Books:

1. Ryan Damian Ryan, "Understanding Digital Marketing ", 3rd edition, Kogan Page.
2. essential-digital-marketing-tools-smart-insights, Smart Insights
3. Nick smith, "Successful seo and search marketing in a week" Hodder & Stoaghton
4. Macarthy Andrew Macarthy, "500 social media marketing", Createspace independent pub.
5. P R Smith E-marketing, "Excellence:-planning optimization your digital marketing", Routhledge.
6. Chuck Hemann Ken Burbary, "Digital Marketing Analytics: Making Sense of Consumer Data in a Digital World", QUE
7. Digital marketing handbook, http://emarketingconsult.com/digital-marketing-handbook-2012

Chapter & Topics –

Unit #	Book	Chapters
Unit 1	1	1,2
Unit 2	2	9,19
Unit 3	2	14,15
Unit 4	2	16,17
Unit 5	2	18
	3	5,20

Practical List:

1. Articulate marketing objective
2. Strategy planning
3. Organic SMM: market your content
4. Paid Social Media Advertising
5. SEO
6. SEM: run AdWord Campaign
7. Display Advertising: evaluate display ad campaign
8. PPC
9. Email Marketing
10. Web analytics

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester V
MCA 506 D : Blockchain Technology

Rationale:
The primary objective of this course is to provide a broad introduction to Blockchain and its application. Blockchain is the distributed and decentralized database technology behind this crypto currency. This course explores the fundamentals of the public, transparent, secure, immutable and distributed database called blockchain. Blockchains can be used to record and transfer any digital asset not just currency. This course will introduce students to the workings and applications of this potentially disruptive technology. Its potential impact on financial services, government, banking, contracting and identity management will be discussed.

Prerequisite: basics of centralized and distributed database and network technologies.

Learning Outcomes:
Students will be able to achieve the following learning objectives at the completion of the course.

1. They will be able to discover blockchain technology.
2. They will be able to learn and explain why we need blockchain. What is the real world problem(s) that blockchain is trying to solve,Understand and describe how blockchain works,Explain the underlying technology of transactions, blocks, proof-of-work, and consensus building, How does blockchain exist in the public domain (decentralized, distributed) yet maintain transparency, privacy, anonymity, security, immutability, history.
3. They will be able to understand that How is blockchain simulated without any central controlling or trusted agency and How bitcoin cryptocurrency works.
4. They will be able to understand Why people value a 'digital' currency, how it can be protected against scam, fraud, hacking and devaluation.
5. They will be able to design and implement new ways of using blockchain for applications other than cryptocurrency and explore platforms such as Ethereum to build applications.
6. All these concepts are important to build their career as Blockchain generalist, blockchain developers and Blockchain contract developer.

Teaching and Evaluation Scheme: Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

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

Course Contents:

UNIT1: Discover Blockchain Technology [20%]

Introduction: History of centralized services, trusted third party for transactions, Making a case for a trustless system, Understand the differences between centralised, decentralised and distributed peer to peer networks, Why blockchain, Decentralized transactions, No permission for transactions needed, Types of Blockchain (Permission Blockchain vs. Permissionless Blockchain), History of Bitcons: How and when blockchain/bitcoin started, Milestones on the development of bitcoin, The problem area and promise of bitcoin, Relation to bitcoin, Requirements for blockchain in a business environment, Requirements deep dive, Sharing economy, Internet of Value.

UNIT2: Fundamental concepts of Blockchain [20%]

Overview of blockchain technology: What is blockchain, Transactions, Blocks, Hashes, Consensus, Verify and confirm blocks, Hashes: Hash cryptography, Encryption vs hashing, Transactions:Recording transactions, Digital signature, Verifying and confirming transactions, Blocks and blockchain: Hash pointers, Blocks, Consensus building: Distributed consensus, Byzantine generals problem, Consensus mechanisms: POW, POS, POB, POA, POET, etc., Blockchain Architecture, Markle Root Tree, blockchain and future world of Web 3.0.

UNIT 3: Mining and simulating blockchain [20%]

Mining and simulating blockchain: Game theory behind competitive mining, Race to beat the others (including hackers), Incentives – mining and transaction fees, CPU considerations, Energy expended in mining, Profitability, Mining pools, Blockchain for Bigdata

UNIT 4 : Bitcoins, Security and Safeguard [20%]

Bitcoin: Bitcoin creation and economy, Bitcoin exchanges, Bitcoin limited supply and deflation? Famous hacks, Wallets, Security and safeguards: Protecting blockchain from attackers, Forks – soft and hard, Blockchain Security : Key Management in Bitcoin, Case Studies.

UNIT 5: Platforms and Applications [20%]

Introduction to Blockchain platform: Ethereum, Hyperledger, IOTA, EOS, Multichain, Bigchain, CORDA, Openchain, SOLIDITY, Design a new blockchain, Potential for disruption, How to incentivize blockchain, Design a Distributed Application (DAPP), Blockchain applications: Government, Identity management, Auto executing contracts, Three signature escrow, Triple entry accounting, Elections and voting?, Property records, titles, Micropayments, Notary, Sidechains, Blockchain Smart Contracts, Challenges and Research Issues in Blockchain.

Text Books:

1. Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Arvind Narayana.
2. Blockchain Basics 2019: The New Updated Inves…(Paperback), by Bradley Lakeman

Reference Books:

1. Blockchain: Step-By- Step Guide to Understand by Paul Laurence
2. Introducing Ethereum and Solidity Foundations of Cryptocurrency and Blockchain Programming for Beginners by Chris Dannen , Apress
3. Hands-On Blockchain for Python Developers: Gain blockchain programming skills to build decentralized applications using Python Paperback
4. Building Blockchain Projects (English, Paperback, Prusty Narayan), Packt
5. Blockchain: The comprehensive beginner?s guid, (Paperback),by frank walrtin
6. Ultimate Blockchain Technology, Mega Edition – Six Books – Best Deal For Beginners in

Blockchain, Blockchain Applications, Cryptocurrency, Bitcoin, Mining and Investing by Lee Sebastian
7. Blockchain And Decentralized Systems(Paperback) by Pavel Kravchenko, Bohdan Skriabin
8. Masters of Blockchain, Digital Assets & the N…(Paperback), by Andrew Romans, Tim Draper

Web References:

1. https://bitcoin.org/bitcoin.pdf
2. http://scet.berkeley.edu/wp-content/uploads/BlockchainPaper.pdf
3. https://www.evry.com/globalassets/insight/bank2020/bank-2020---blockchain-powering-the-internet-of-value---whitepaper.pdf
4. https://media.consensys.net/programmable-blockchains-in-context-ethereum-s-future-cd8451eb421e#.z4788f3kx
5. https://github.com/anders94/blockchain-demo
6. http://blockchain.mit.edu/how-blockchain-works
7. https://anders.com/blockchain/
8. http://learnmeabitcoin.com/

Live Map or Reachable Nodes

9. https://bitnodes.earn.com/nodes/live-map/

Realtime Bitcoin Globe

10. https://blocks.wizb.it/

Unconfirmed Transactions Visualization

11. http://dailyblockchain.github.io/

Note: Practical can be performed using Open Source Ethereum /Truffle/IBM platform/Solidity/ etc.

Tentative List of Praticals :

1. Explore various popular blockchain applications. Create a list of those applications and the industries/businesses they are impacting
2. Explore the bitcoin blockchain on blockchain.info
3. Use an online service to generate hashes for content
4. Build a transaction and then hash it. Generate public and private keys. Digitally sign a transaction
5. Explore the bitcoin blockchain on blockchain.info for block generation. Explore how long it takes a block to be confirmed.
6. Use an online service to illustrate how consensus is built in a distributed system with no central authority.
7. What is the computing power needed to mine and generate bitcoin? Explore if miner pools are dominating bitcoin mining. Compare incentives from mining activity vs transaction fees.
8. Install a bitcoin wallet. Generate and secure your private key.
9. Send a small transaction amount (to be monetized by instructor) to another user. Track the transaction through blockchain. Verify the confirmation and commitment of the transaction to the bitcoin blockchain.
10. Pick three industries. Research the application of blockchain in those industries. Describe how blockchain could be successful in those industries.
11. Set up the Hyperledger Composer Playground
12. Transfer assets in a blockchain network
13. Explore editor views archive data

14. Create Decentralised application such as Elections.(Using Truffle framework, metamask, ganache)
15. Writing script to create block, perform transaction and validate and verify (mining) using any programming language such as **python, node js, javascript, java.**
16. Implementing smart contract using solidity on **Remix** (https://remix.ethereum.org/#optimize=false&version=soljson-v0.5.1+commit.c8a2cb62.js). It is online IDE that is use to execute and test smart contract.
17. Installing and configure **Ganache** which is in memory local platform for blockchain (https://truffleframework.com/ganache). Install and configure **Metamask** which is available in different extension with browser. Install chrome extension of metamast. Import account from Ganache into metamask and perform transaction and observe block.

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester V
MCA 507 : Mini Project - II

Rationale:
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.

Teaching and Guiding Scheme:
Students have to develop project either in the institute or in some industry. They have to 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.

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

Practical: Visual Studio, JDK, Android SDK, SDK for windows phone or any other tool (as applicable) will be used.

Evaluation Scheme:

Internal: **[IA + IB + IC] : [10 + 10 + 5 = 25]**
IA – Project Analysis
IB – Project Design & Development
IC – Project Implementation & Testing

External: **[EA + EB + EC] : [30 + 30 + 15 = 75]**
EA – Project Analysis
EB – Project Design & Development
EC – Project Implementation & Testing

SEMESTER – VI

Kadi Sarva Vishwavidyalaya, Gandhinagar
MCA Semester VI
MCA 601: Industry Project

Rationale:
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 Outcomes:
Students will come out as complete Software Engineer who will be ready to work in the Industry atmosphere and its deadlines

Teaching and Guiding Scheme:
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.

Sub Total Credit	Teaching scheme (per week)		Examination scheme				
			MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
24	16 Week (48 Hrs at Industry Side per week)		-	200	-	500	700

Practical: Visual Studio, JDK, Android SDK, SDK for windows phone or any other tool (as applicable) will be used for practical programs

Evaluation Scheme:

Internal: **[IA + IB + IC + ID] : [25 + 100 + 125 + 50 = 300]**
IA – Project Definition
IB – Project Analysis
IC – Project Design & Development
ID – Project Implementation & Testing

External: **[EA + EB + EC + ED] : [50 + 150 + 200 + 100 = 500]**
EA – Project Definition
EB – Project Analysis
EC – Project Design & Development
ED – Project Implementation & Testing