SRI VENKATESWARA UNIVERSITY, TIRUPATI

SVU COLLEGE OF COMMERCE MANAGEMENT & COMPUTER SCIENCE

MASTER OF COMPUTER APPLICATIONS (MCA)

Degree Programme

CHOICE-BASED CREDIT SYSTEM (CBCS) (w.e.f. 2016 – 2017)

(For Regular students studying in Dept. of Computer Science, S.V. University

& Affiliated Colleges, S.V. University)

REGULATIONS - 2016

1. **Duration of the Program:**
   The professional postgraduate programme leading to the degree of Master of Computer Applications will extend 3 academic years/over a period of six semesters each semester will normally have duration of 90 working days.

2. **Minimum Qualifications for Admission :**
   Candidates for admission into the first semester of the M.C.A. degree programme must have a B.Tech / B.C.A / B.Sc / B.Com / B.A degree or any equivalent graduation program with Mathematics as one of the subject at 10+2 level or at graduation.

3. **Admission Procedure**
   3.1. Admission into MCA Program will be only through ICET Examination for Indian Students conducted by Andhra Pradesh State Council of Higher Education(APSCHE).
   3.2. Admission of Foreign / NRI Students for MCA Program:
      o Students should have earned their qualifying degree from a University / Institute recognized by the Association of Indian Universities / similar Indian body.
      o Students nominated by Foreign Governments may be accepted to MCA programmes, without any further test / interview, if their request for admission is routed through MHRD / any agency of the Government of India.

4. **Structure of the Programme**:
   The M.C.A. programme has a curriculum, with syllabus consisting of:

   • Core courses, which give a broad base in the main field of study in the academic programme concerned
   • Elective courses chosen by the student in consultation with the faculty adviser
   • Elective Course: Elective course is a course which can be chosen from a pool of papers. It may be:
      o Supportive to the discipline of study

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- o Providing an expanded scope
- o Enabling an exposure to some other discipline/domain
- o Nurturing student's proficiency/skill.

An elective may be "Generic Elective" focusing on those courses which add generic proficiency to the students. These electives shall be "Discipline centric".

- Second type elective may be open elective and shall be offered for other disciplines.
- The Foundation Courses may be of two kinds: Compulsory Foundation and Elective foundation. "Compulsory Foundation" courses are the courses based upon the content that leads to Knowledge enhancement. They are mandatory for all disciplines. Elective Foundation courses are value-based and are aimed at man-making education.
- Laboratory, project work and software design courses where special emphasis is laid on the application of knowledge to real-life problems.
- The program will also include seminars, Technical Seminars, Group discussions and practical Industry exposure training, as prescribed by the Board of Studies in the curriculum & syllabus and approved by the Academic Council.
- In addition, the students may audit courses, in consultation with the faculty adviser.

5. **The Credit System:**
- Each course has a certain number of credits assigned to it, depending upon whether it is a lecture or tutorial or practical work and the number of periods assigned per week. The practical courses shall include laboratory work and project work.

- **The credits are assigned according to the following pattern:**
  - o 1 credit for each lecture period/week,
  - o 1 credit for each tutorial period/week,
  - o 1 credit for each practical session of 2 periods/week &
  - o 2 credits for each project session of 3 periods / week.

6. **Minimum Instruction Days:**
- The normal duration of MCA Course is six semesters.
- Semesters, I, II, III, IV, and V shall consist of a minimum of 90 instruction days (based on six instruction days per week) excluding the days allotted for tests, examinations and preparation holidays.
- Sixth semester shall consist of a minimum of 15 weeks for undertaking major project work either in the College or any of the recognized Public Service Sectors/ Government Sectors, National Laboratories and Industrial Houses or any other organizations approved by the Department.

7. **Course Registration:**
Every student has to register for the set of courses offered by the Department in that semester including those of Open Elective courses and MOOCS courses with the total number of their Credits being limited by considering the permissible weekly contact hours.

8. **Credits Required for Award of MCA Degree:**
A student earns credits by passing courses every semester. A student, who has registered the M.C.A. degree programme, has to acquire 162 credits to be come eligible for the award of the degree.

9. **Evaluation of Academic Performance:**

The performance of the students in each semester shall be evaluated paper wise. The Scheme of instruction and Examinations shown in Annexure -I shall be followed. The distribution of marks between sessional work (based on internal assessment) and University Examination is as follows:

Paper Category	Sessional Marks	University Examination Marks
Theory	**20**	**80**
Practical	**20** **Designing of the Program (05) + Program Execution (10) + Viva-Voce(05)**	**80** **Record (20) + Designing of the Program (20) + Program Execution(30) + Viva Voce(10)**
Seminar / Technical Seminars / Group discussion	**50** **Content Preparation (12) + Communication Skills (12) +** **Presentation Skills (12) + Attempting Queries (14)**	-
Minor Project Work	**20** **Presentation(10) + Viva Voce (10)**	**80** **Documentation (10) + Presentation(20) + Execution(30) + Viva Voce (20)**
	100 **Project Documentation (50)** **Presentation(30) + Viva Voce (20)**	**200** **paper based on project should be submitted to the National / International Conference and Published in the Proceedings** **Or paper based on project Should be published in National / International Journal (50 Marks)** 1. **Project Documentation : 50 Marks** 2. **Presentation : 50 Marks** **Viva Voce : 50 Marks**

- For both Theory and Laboratory papers two Internal Assessments will be conducted and best of two Assessments considered for award of Sessional marks. The duration of the these tests will be 2 hours. These sessional marks are to be communicated to the Controller of Examinations Office on or before the commencement of the end Semester examination.

10. University Examinations:

10.1. For each theory subject, there shall be a comprehensive University Examination of three hours duration. Setting of Question papers shall be done by external examiners from the panels recommended by the Board of Studies.

10.2. (a) For each practical subject, the University Examination shall be conducted by one Internal examiner and one external examiner/two examiners.

(b) Viva -Voce examination in practical subject shall be conducted by Examiners (One Internal and One External Examiner/Two Examiners)

10.3. Viva-Voce Examination in Minor Project Work shall be conducted by One Internal Examiner and One External Examiner / Two Examiners

10.4. Viva-voce examination in Major Project Work shall be conducted by a committee consisting of Two External Examiners and One Internal Examiner / Three Examiners

10.5. (a) The Examiners for Practical examinations and Viva-voce examinations (Stated in 10.2) shall be appointed from among the panels submitted by the Chairperson/Chairman of the Board of Studies.

(b) The Examiners for Project report evaluation for Minor/Major Project Works and Viva Voce examination for Minor/Major Project Works (Stated in 10.3, 10.4) shall be appointed from among the panels submitted by the Chairperson/Chairman of the Board of Studies.

10.6. The internal examiners for theory/practical/minor project work shall have at least three years of teaching experience at PG level in ratified position.

10.7. The internal examiners for major project work shall have at least five years of teaching experience at PG level in ratified position.

11. Attendance Requirements:

11.1. Regular course of study, in a semester, means a minimum average attendance of 75% in all the papers computed by totaling the number of periods of lectures, tutorials, and practical's and project as the case may be, held in every paper as the denominator and the total number of periods attended by the student in all papers, as the numerator.

11.2. However, a student has to put in a minimum attendance of 50% in each subject, in addition to the condition laid down in clause 11.1.

11.3. No consideration whatsoever in attendance will be shown to any student for late admission due to any reason.

11.4. Condonation of shortage of attendance may be recommended provided a student puts in at least 62.5% attendance, in all the papers put together as calculated in clause 11.1 above, along with a minimum of 50% attendance in each subject as stated in clause 11.2, and provided the Principal is satisfied with the reason for shortage of attendance.

11.5. A student, who could not satisfy these requirements of attendance as given in clauses above, in any semester, shall have to repeat that semester.

11.6. A student shall not be permitted to study any semester for more than three times during the course of study.

11.7. A certificate of satisfactory attendance must be submitted by the student from the organization where he/she undertakes Project Work. For the above purpose, the candidate is not expected to avail more than 12 working days of leave of absence.

11.8. Further, a student is required to complete the course of study satisfying the attendance requirements in all the six semesters, within a period of first twelve semesters from the time of admission, failing which he/she shall forfeit his /her seat.

11.9. A student, who has not satisfied the minimum attendance requirements in any semester, may repeat that semester after obtaining written permission from the Principal, canceling the previous record of attendance and sessional marks of that semester. However, this facility may be availed by any student not more than twice during the entire course of study and the entire course of study shall be within the first twelve semesters as stipulated in clause 11.8.

12. Academic Requirements:

12.1. A candidate shall be declared to have passed whole examination of a semester if he/she secures a minimum aggregate of 50% along with minimum marks of 40% in the University Examination in each theory and practical paper, including project work. Aggregate for this purpose shall mean the total marks obtained in the University Examination and sessionals put together in all the papers of that semester.

12.2. A candidate who secures a minimum aggregate of 50% in any semester as specified in clause 12.1, but fails to secure the paper minimum of 40% in the University Examination in any paper, shall be declared to have failed in that paper. The candidate may appear for the University Examination in such papers as and when conducted and pass by securing the subject minimum of 40% in each of such papers.

12.3. A candidate, who could not secure the minimum aggregate of 50% in any semester, as given in clause 12.1, shall be declared to have exempted in such theory papers in which he/she secured a minimum of 50% of the marks in the University Examination.

12.4. A candidate who could not secure the minimum aggregate of 50% in any semester, as given in clause 12.1, shall be declared to have exempted in such practical papers in which he/she secured a minimum of 40% in the University Examination and a minimum of 50% of the marks in the University Examination and sessionals put together in each of such papers.

12.5. A candidate has to appear for all the other papers in which he/she has not satisfied the stipulations of clauses 12.3 and 12.4, and pass compartmentally by satisfying the stipulations stated in clauses 12.3 and 12.4. Rechecking of the aggregate shall not arise when a candidate opts for compartmental passing.

12.6. Candidates who would not like to avail themselves of the facility of compartmental pass given in clauses 10.3, 10.4 and 10.5 may reappear for the whole examination of that semester, after canceling the previous result. In such a case, clauses 12.1 to 12.5 shall apply in that order.

12.7. Candidates shall register for improvement in one or more theory papers of a semester indicating the same in the application form. However, improvement facility is not extended to practical and project work papers.

NOTE: The question of checking the aggregate shall arise only when the candidate registers for the whole examinations for the first time or when he/she registers for the whole examinations at a subsequent attempt after having canceled the previous result.

13. **Condition of Promotion:**

A candidate shall be promoted to the next semester, if he/she satisfies the minimum attendance requirements of that semester of MCA as stipulated in clause 12.

14. **Award of Degree:**

The degree of MCA shall be conferred on a candidate who has satisfied the following conditions:

14.1. The candidate, after admission to the MCA program of the University, must have studied each of the six semesters of MCA program at least once in any college to which affiliation is accorded by S.V.University to offer MCA Programme.

14.2. The candidate must have satisfied minimum attendance requirements as stipulated in clause 11, and minimum academic requirements as prescribed in clause 12, in each of the six semesters of the MCA program.

14.3. The Programme of Study for the M.C.A. Degree shall cover normally a period of Three academic years, comprising of Six semesters and No student shall be permitted to complete the course of study of M.C.A. Degree earlier than six semesters or to take not more than twelve consecutive semesters, failing which he / she shall forfeits his / her seat.

15. **Award Grades and Grade Points:**

15.1. After a candidate has satisfied all requirements for the award of the degree as specified in clause 14, he/she shall be placed in one of the following three classifications, irrespective of whether the candidate passed compartmentally or otherwise, even after the regular period of study of six semesters.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

Semester Grade Point Average (SGPA): It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places

SGPA (Si) = $\sum (C_i \times G_i) / \sum C_i$

where C_i is the number of credits of the ith course and G_i is the grade point scored by the student in the ith course.

The **CGPA** is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places

CGPA = $\sum(C_i \times S_i) / \sum C_i$

Where S_i is the SGPA of the ith semester and C_i is the total number of credits in that semester. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts

Letter Grades and Grade Points

A 10 point grading system with the following letter grades is to be followed:

Letter Grade	Range of Marks	Grade Points
O (Outstanding)	75-100	7.5-10
A+(Excellent)	65-74	6.5-7.4
A(Very Good)	60-64	6.0-6.4
B+(Good)	55-59	5.5-5.9
B(Above Average)	50-54	5.0-5.4
C(Average)	41-49	4.1-4.9
P (Pass)	40	4.0
F(Fail)	< 40	00.39
Ab (Absent)	-	0

A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.

For this purpose, aggregate shall mean the aggregate of the marks in the University Examinations and sessionals put together at all six semester of MCA.

15.2. In each Semester every student who satisfies the attendance requirements should register for examination, failing which he/she shall not be promoted to the next semester. Any such student who has not registered for examination in a semester shell repeat that semester in the next academic year after obtaining the proceedings of the Principal.

15.3. To pass a course in PG Programme, a student has to secure the minimum grade of (P) in the PG Semester end Examinations. A student obtaining Grade F shall be considered failed and will be required to reappear in the examination as supplementary candidate.

15.4. A student is eligible to improve the marks in a paper in which he has already passed, in with 4 years from the year of admission as and when it is conducted for the subsequent batches. This provision shall not be provided once the candidate is awarded Degree.

15.5. A student who has failed in a course can reappear for the End-Semester Examination as and when it is held in the normal course. The Sessional Marks obtained by the student will be carried over for declaring the result.

15.6. Whenever the syllabus is revised for a course, the semester a Examination shall be held in old syllabus three times. Thereafter, the students who failed in that course shall take the semester end Examination in the revised syllabus.

16. Award of Rank:

The rank shall be awarded based on the following:

16.1. Ranks shall be awarded for the top ten students appearing for the regular MCA examination.

16.2. Only such candidates, who satisfy the minimum academic requirements as stipulated in clause 12, by the end of their sixth semester, and become eligible for the award of the degree, are eligible for the award of rank. Candidates, who lose one or more semesters for any reason whatever, are not eligible for the award of rank.

16.3. For the purpose of awarding rank, aggregate of marks in University Examination and Sessionals put together at all the semesters of MCA, secured at the first attempt only, shall be taken into account.

16.4. Award of Prizes, scholarships and other honors shall be according to the rank secured by a candidate, consistent with the desire of the Donor.

17. Transitory Regulations:

17.1. Candidates who studied the MCA Course under the Regulations (Semester Pattern) 2006 and revised syllabus from 2007-08 & 2010-2011 but who could not satisfy the minimum attendance requirements in any semester may join the appropriate semester in the Regulations (For the full time, regular course) – 2015-16 for the remaining part of the course and be governed by the Regulations of that batch from then on. Any candidate admitted under the Regulations who wished to join under the Regulations, 2015-2016 under any other circumstances may also join the appropriate semester and be governed by the Regulations-2015-16 from that semester onwards.

17.2. University Examinations shall be conducted three more times, after the last regular examination, in all those papers prescribed under the Regulations, 2006 and revised syllabus from 2007-2008 & 2010-2011.

17.3. Candidates, who satisfied the minimum attendance requirements in any semester under the Regulations, 2006 and revised syllabus from 2007-08 & 2010-2011 but who are yet to pass some papers of that semester even after Three chances shall appear for the equivalent papers under Regulations-2015-2016, specified by the Chairman / Chairperson of the Board of Studies.

18. Amendments to the Regulations:

The University may, from time to time, revise, amend, or change the Regulations, Scheme of Instructions, Examinations and Syllabi, whenever necessary.

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Semester	Course Number	Course Title	Core / Generic Elective/ open Elective	No of Credits	L	T	P	TOTAL	Max. Marks Sess.	Univ	Total Marks
I	MCA 101	Discrete Mathematical Structures	Compulsory Foundations	4	3	1	-	4	20	80	100
	MCA 102	Introduction to Internet Technologies	Core	4	3	1	-	4	20	80	100
	MCA 103	Object Oriented Programming with JAVA	Core	4	3	1	-	4	20	80	100
	MCA 104	Computer Organization	Core	4	3	1	-	4	20	80	100
	MCA 105	**105A** Business and Management **105B** Essentials of Management	Generic Elective	4	3	1	-	4	20	80	100
	MCA 106	Human Values and Professional Ethics	Compulsory Foundation	2	-	-	-	2		50	50
	MCA 107P	Software Lab based in 101 & 103	--	4	-	-	4	4	20	80	100
	MCA 108P	Internet technologies Lab	--	4	-	-	4	4	20	80	100
	MCA 109P	PC Hardware & Office Automation Lab	--	4	-	-	4	4	20	80	100
				34							**850**
II	MCA 201	**201A** Probability and Statistics for Computer Applications **201B** Statistical Methods for Computer Applications	Generic Elective	4	3	1	-	4	20	80	100
	MCA 202	Data Structures using JAVA	Core	4	3	1	-	4	20	80	100
	MCA 203	Operating Systems	Core	4	3	1	-	4	20	80	100
	MCA 204	Advanced Database Management Systems	Core	4	3	1	-	4	20	80	100
	MCA 205	Data Science Essentials	Compulsory Foundation	2	2	-	-	2			50
	MCA 206	Leadership values	Compulsory Foundation	2	2	-	-	2			50
	MCA 207P	Software Lab (based on 201 & 203)	--	4	-	-	4	4	20	80	100
	MCA 208P	Data Structures Lab	--	4	-	-	4	4	20	80	100
	MCA 209P	Advanced Database Management Systems Lab	--	4	-	-	4	4	20	80	100
	MCA 210S	Group Discussions		2				2			50
				30							**750**

Sem	Course Code	Course Name	Category								
III	MCA 301	Computer Oriented Operations Research	Compulsory Foundation	4	3	1	-	4	20	80	100
	MCA 302	Data Communications and Computer Networks	Core	4	3	1	-	4	20	80	100
	MCA 303	Software Engineering	Core	4	3	1	-	4	20	80	100
	MCA 304	Computer Graphics	Core	4	3	1	-	4	20	80	100
	MCA305	Technical Communication and Computer Ethics	Elective Foundation	2	-	-	-	2			50
	MCA 306	The courses offered by other departments	Open Elective	4	-	-	-	-			100
	MCA 307P	Software lab (based on 301, 302 & 305)	--	4	-	-	4	4	20	80	100
	MCA 308P	Software Engineering Lab	--	4	-	-	4	4	20	80	100
	MCA 309P	Computer Graphics Lab	--	4	-	-	4	4	20	80	100
	MCA 310S	Seminar & Group Discussions	---	2	-	-	-	2	50		50
				36							**900**
IV	MCA 401	Data Warehousing and Data Mining	Core	4	3	1	-	4	20	80	100
	MCA 402	System Programming	Core	4	3	1	-	4	20	80	100
	MCA 403	**403A** Web Programming **403B** Artificial Intelligence **403C** Software Testing	Generic Elective	4	3	1	-	4	20	80	100
	MCA 404	**404A** E-Commerce **404B** Cyber Security **404C** Neural Networks	Generic Elective	4	3	1	-	4	20	80	100
	MCA 405	**405A** Accounting and Financial Management **405B** Accounting Essentials for Computer Applications	Generic Elective	4	3	1	-	4	20	80	100
	MCA 406	The courses offered by other departments	Open Elective	4							100
	MCA 407P	Data Mining Lab	---	4	-	-	4	4	20	80	100
	MCA 408P	System Programming Lab	---	4	-	-	4	4	20	80	100
	MCA 409P	Minor Project (by taking case studies from the Generic Elective courses)	---	4	-	-	4	4	20	80	100
	MCA 410S	Technical Seminar		2							50
				38							**950**

Sem	Code	Course	Category								
V	MCA 501	Big data and Business Analytics	Core	4	3	1		4	20	80	100
	MCA 502	Cloud Computing	Core	4	3	1		4	20	80	100
	MCA 503	**Elective III** **503A** User Interface Design **503B** Cryptography and Network Security **503C** Mobile App Development **503D** IT in Forensic Science	Generic Elective	4	3	1	-	4	20	80	100
	MCA 504	**Elective IV** **504A** Image Processing **504B** Multimedia System **504C** Natural Language Processing	Generic Elective	4	3	1	-	4	20	80	100
	MCA 505P	Software Lab (Case studies from 501)	--	4	-	-	4	4	20	80	100
	MCA 506P	Software Lab (Case studies from 502)	--	4	-	-	4	4	20	80	100
	MCA 507P	Minor Project Work	--	4	-	-	4	4	20	80	100
	MCA 508S	Seminar	--	2	-	-	-	2	50		50
				30							800
VI		Major Project Work		12							300
		Total Score		180							4500

The following are the Open Elective Courses Offered by the Department Of Computer Science for the Students other Disciplines:

MCA III Semester :
1. Programming in C
2. Office Automation
3. Internet Fundamentals

MCA IV Semester :
3. Open Source Tools
4. Internet of things
5. Web Design Concepts

MCA 101 : DISCRETE MATHEMATICAL STRUCTURES

UNIT-I:

Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions. Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroups.

UNIT-II:

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, and complemented lattices. Combinatorics: Basic Counting Technique, Pigeon-hole Principle, Recurrence Relation, Generating function, Polya's Counting Theorem Paths and Circuits : Isomorphism, Subgraphs, Walks, Paths and Circuits, Connected and disconnected graphs, Euler graphs, Operations on graphs, Hamiltonian graphs, Travelling salesman problem.

UNIT-III:

Introduction and Basic Concepts : Definition, Representation of graphs, Finite and infinite graphs, Directed graphs, Incidence and degree, Bipartite graph, Planar graphs, Matrix representation of graphs, Applications of graph in computer science. Graphs: Simple graph, multi graph, graph terminology, representation of graphs, Bipartite, Regular, Planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs.

Trees and Fundamental Circuits : Definition, Properties of trees, Spanning trees, Fundamental circuits and cut-sets, Connectivity and separability, Minimal spanning tree and connected algorithms, Rooted and Binary trees, Applications of trees.

UNIT-IV:

Tree: Definition, Rooted tree, properties of trees, binary search tree, tree traversal. Shortest Path Problems: Shortest path algorithms, Generalized shortest path algorithms, Applications of shortest path problems.

Network Flow Problems: Flows in network, formulation, Max-flow min-cut theorem, Minimum cost flow problems, Ford-Fulkerson algorithm for maximum flow.

UNIT - V:

Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

Text books
1. Discrete Mathematics and Its Applications, By Kenneth H Rosen, McGraw Hill, Sept.2002.
2. Discrete Mathematical Structures with Applications to Computer Science, By J.P.Tremblay, R.Manohar, McGraw Hill Pub, 1975.

3. "Graph Theory With Applications to Engineering and Computer Science" Prentice Hall,
   a. Englewood Cliffs, 1974

4. Combinatorics: Theory and Applications, By V. Krishnamurthy, East-West Press Pvt. Ltd.,New Delhi, 1986.
5. K. L. P. Mishra, N. Chandrasekaran, "Theory of Computer Science: Automata,
   a. Languages and Computation, PHI Publication
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MCA 102 : INTRODUCTION TO INTERNET TECHNOLOGIES

UNIT - I

Introduction to Internet, Internet Services, WWW, Working of Internet, Internet Connection Concepts, Introduction to Intranet, DNS working, Configuring Internet Connection, Connecting LAN to Internet. Single User, Multi User, Server, Workstation, Client-Server environment, Computer Network, Types of Computer Network: LAN, WAN, MAN; Network Topologies. Protocols used in internet FTP, HTTP etc. Windows and GUI. Latest Developments and usage of Internet for IOT, Cloud Computing, Web Services.

UNIT - II

E-Mail Concepts – Configuring E-Mail Program, Sending and Receiving Files through E-Mail, Fighting Spam, Sorting Mail, and avoiding E-Mail viruses. Web-Based chat rooms and discussion boards, Voice and Video conferencing. Streamlining Browsing, Keeping track of Favorite Web Sites, Web Security, Privacy, and Site-Blocking. Searching the Web – Audio and Video on the Web. Two tier-Three Architectures, Internet Architecture

UNIT-III

Web Browsers, Search Engines, Categories of Search Engines, Searching Criterion, Surfing the Net, Hypertext Transfer Protocol (HTTP), URL. Other Internet Tools. Online Chatting, Messaging, and Conferencing Concepts, E-Mail mailing lists, Usenet newsgroup concepts – Reading usenet newsgroups, Internet Relay Chat, Instant messaging.

UNIT-IV

HTML-5: Internet Language, Understanding HTML, Create a Web Page, Linking to other Web Pages, Publishing HTML Pages, Text Alignment and Lists, Text Formatting Fonts Control, E-mail Links and link within a Page, Creating HTML Forms with HTML 5 controls.

UNIT - V

Creating Web Page Graphics, Putting Graphics on a Web Page, Custom Backgrounds and Colors, Creating Animated Graphics. Web Page Design and layout, Advanced Layout with Tables, Using Style Sheets.

Text Books:
1. Dick Oliver: Tech Yourself HTML 4 in 24 Hours, Techmedia.
2. Satish Jain: "O" – Level Information Technology,
3. Craig Zacker: 10 minutes Guide to HTML Style Sheets, PHI.
4. V.K. Jain: "O" – Level Information Technology, BPB Publications.
5. Gill, Nasib Singh: Essentials of Computer and Network Technology, Khanna Books
6. Publishing Co., New Delhi.
7. Margaret Levine Young: Internet – The Complete Reference
8. Harley Hahn: The Internet – Complete Reference, TMH.
9. Rajender Singh Chillar: Application of IT to Business, Ramesh Publishers, Jaipur.
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MCA 103: Object Oriented Programming With Java

UNIT – I

Object Oriented Programming Fundamentals & Java: Java Features, Object Oriented Programming Concepts –Abstraction, Encapsulation, Inheritance and Polymorphism. Java Fundamentals: Data Types, variables, arrays, Inheritance to classes: class fundamentals, Objects, References, Constructors, Overloading of methods, Access control, Nested and Inner classes. Inheritance: Inheritance basics, Using Super, multilevel hierarchy, method overriding, dynamic method dispatch, abstract classes, final with inheritance.

UNIT-II

Packages, Exceptions and Threads: Packages and Interfaces: Packages, Access protection, Importing packages, interfaces, Exception Handling: fundamentals, exception types, uncaught exceptions, using try, nested try statements, throw, throws, Java built-in exceptions, user defined exceptions. Multithreading: Thread model, main thread, creating a thread, multiple threads, thread priorities, synchronization, Inter thread communication, String handling.

UNIT-III

Java Utilities: Type wrappers: Number, Double, Float, Byte, Short, Integer and Long, Character, Boolean, Math class. Collections: Collection interfaces, collection classes, legacy classes and interfaces: Enumeration interface, Vector, Stack, Dictionary, Hash table. More utility classes: String Tokenizer, Bit set, Date, And Calendar Input/output: File, Stream classes, Byte Streams, Character Streams.

UNIT-IV

GUI Programming Features Applets: Applet basics, Applet architecture, an applet skeleton, Applet display method, Repainting, Using Status window, HTML APPLET tag, passing parameters to applet, Audio Clip interface. Even Handling; two event handling mechanisms, Event model, Event classes, sources of events, Event Listener interfaces, Adapter classes. Introduction to SWING: Window Fundamentals, working with frame windows, creating window programs, working with color, fonts, SWING Controls, Layout Managers and Menus: Control fundamentals, Labels, Using buttons, check boxes, checkbox group, choice controls, lists, scroll bars, text field, layout managers, menu bars, and menus.

UNIT - V

Networking in Java Network Programming with Java, Networking classes and Interfaces, Inet Address, Factory method, Instance Methods, Sockets, Knowing IP address, URL-URL Connection class. Creating a server that sends data, creating a client that receives data, two way communication between server and client, Stages in a JDBC program, registering the driver, connecting to a database, Preparing SQL statements, improving the performance of a JDBC program.

Text Book
1. Herbert Schildt : "The Complete Reference Java 2"(Fifth Edition),TMH.

Reference Books
1. Dietel & Dietel : "Java2 How to Program", Prentice Hall.
2. Thamus Wu: "An Introduction to Object Oriented Programming With Java." TMH
3. Balagurusamy:"Programming With Java": TMH.

MCA104: COMPUTER ORGANIZATION

UNIT I

Logic Circuits: Logic functions – synthesis of logic functions – Minimizations of logic - Synthesis with NAND and NOR gates Implementation of Logic gates - Flip-flops – Registers and shift registers – counters – decoders – Multiplexers – PLDs – sequential circuits. Basic Structure of Computers: Functional UNITs - Basic operational concepts – Bus structures – performance – Multi processors and Multi computers: Functional UNITs – Basic operational concepts – Bus structures – performance – Multiprocessors and Multi computers – Historical Perspective.

UNIT II

Machine Instructions and programs: Numbers, Arithmetic operations and characters – Memory locations and address, operations – instructions and instruction, sequencing – addressing modes.

UNIT III

Input / Output organization: accessing I/O Devices – Interrupts – direct memory access – buses 240-interface circuits – Standard I/O Interfaces.

UNIT IV

Memory System, Concepts – semiconductor RAM memories - Read only memories – cache memories – performance considerations – virtual memories management requirements – secondary storage Arithmetic: Addition and subtraction of sign members – design of fast adders – multiplication of positive members – signed operand multiplication – fast multiplication – integer division – floating point numbers and operations.

UNIT V

Basic Processing UNIT: Concepts – execution of a complete instruction – Multiple – Bus organization – hardware control – micro programmed control. Pipelining: Concepts – Data hazards – instruction hazards – influence on Instruction sets - data path and control constructions – supers cal operation- ultra SPARC II – Performance considerations.

Text Book:

1. Hamacher C, Vranesic Z, and Zaky S. Computer Organization, 5th edition, Mc Graw – Hill,2002.

Reference Books:

1. Stallings W, Computer Organization and Architecture, 6th edition. Parson Education,2003.
2. Mano M.M. Computer System Architecture, 3rd edition. PHI, 1993.
3. Yarbrough JM, Digital Logic – Applications and Design, Thomas Lernig, 1997.
4. Heuring VP, and Jordan HF, Computer Systems Design and Architecture, PearsonEducation, 1997.

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<div align="center">**MCA 105 A: Business and Management**</div>

UNIT-I

Management science Theory and practices: Definition, evolution of Management Thought, Systematic Approach, Functions of Managers. Management and Society: Social Responsibility, Ethics in managing. International Management: International Management and multinational corporations, porters competitive advantage of nations

UNIT-II

Communication: purpose of communication, process, communication in the organization, electronic media in communication Planning: Types, steps, objectives. Strategic planning process, tows matrix, portfolio matrix, premising and forcasting.

UNIT-III

Decision Making: importance and limitations, development of alternatives, evaluation and selection, programmed and non programmed decisions, decision making under certainty, uncertainty and risk.

UNIT-IV

Organizing: formal and informal, organizational levels, reengineering the organization, structure and process of organizing, line staff authority: line staff concepts and functional authority, decentralization and delegation of authority

UNIT - V

Staffing: factors affecting staffing, systems approach to selection, characteristics needed by the managers, selection process, technique and instruments. Performance appraisal: importance and choosing of appraisal, team evaluation approach, rewards and stress of managers set Staffing functions, Selection, Leadership: ingredients of leadership, leadership behavior and styles, transactional and transformational leadership.

Text Books:
1. Management:Text & Cases,Satya Raju,2nd Ed,PHI
2. Management Science,Rao,Scitech

References:
1. Mgmt. Concept & Strategies, Chandan,VIKAS
2. Mgmt. Concept & Strategies, Chandan,VIKAS
3. Management Science,Rao,Scitech

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<div align="center">**MCA 105 B: Essentials of Management**</div>

UNIT-I

Basics of management; Planning, scheduling, organizing, staffing, directing, controlling

UNIT-II

Managerial economics and financial management, productivity management

UNIT-III

Human resource development and management, selection, training and role of IT

UNIT-IV

Introduction to management control systems: goals, strategies; Performance measures

UNIT – V

Strategy: firm and its environment, strategies and resources, industry structure and analysis, corporate strategies and its evaluation, strategies for growth and diversification, strategic planning

Text Books:
1. Essentials of Management, Koontz, TMH
2. Management:Text & Cases,Satya Raju,2nd Ed,PHI
3. BO and Principles of Management, A. Roy, TMH
4. Mgmt. Text & Cases, V.S. P. Rao & Harikrishna, EXCEL BOOKS
5. Mgmt. Concept & Strategies, Chandan,VIKAS
6. Principal & Practice of Mgmt.,Ghanekar, EPH
7. Principal & Practice of Mgmt, Amrita Singh, EPH

MCA 106: Human values and Professional Ethics

UNIT I

Definition and Nature of Ethics- Its relation to Religion, Politics, Business, Law, Medicine and Environment. Need and Importance of Professional Ethics- Goals – Ethical Values in various Professions.

UNIT II

Nature of Values- Good and Bad, Ends and Means, Actual and potential Values, Objective and Subjective Values, Analysis of basic moral concepts- right, ought, duty, obligation, justice, responsibility and freedom, Good behavior and respect for elders, Character and Conduct.

UNIT III

Individual and society: Ahimsa (Non-Violence), Satya (Truth), Brahmacharya (Celibacy), Asteya (Non possession) and Aparigraha (Non-stealing). Purusharthas (Cardinal virtues)- Dharma (Righteousness), Artha (Wealth), Kama (Fulfillment Bodily Desires), Moksha (Liberation).

UNIT IV

Bhagavad Gita – (a) Niskama karma. (b) Buddhism – The Four Noble Truths – Arya astanga marga, (c) Jainism – mahavratas and anuvratas. Values Embedded in Various Religions, Relirious Tolerance, Gandhian Ethics.

UNIT V

Crime and Theories of punishment – (a) Reformative, Retributive and Deterrent. (b) Views on manu and Yajnavalkya.

Text Books:
1. John S Mackenjie: A manual of ethics.
2. "The Ethics of Management" by Larue Tone Hosmer, Richard D. Irwin Inc.
3. "Management Ethics – integrity at work" by Joseph A. Petrick and John F. Quinn, Response Books: New Delhi.
4. "Ethics in Management" by S.A. Sherlekar, Himalaya Publishing House.
5. Harold H. Titus: Ethics for Today
6. Maitra, S.K: Hindu Ethics
7. William Lilly: Introduction to Ethics
8. Sinha: A Manual of Ethics

MCA II-Semester

MCA 201A : PROBABILITY AND STATISTICS FOR COMPUTER APPLICATIONS

UNIT I

Probability: Sample space and events – Probability – The axioms of probability – some elementary theorems – conditional probability – Bayes Theorem.

UNIT II

Random variables – Discrete and continuous – Distribution – Distribution, function. Binomial Poisson and Normal distributions – related properties.

UNIT III

Sampling distribution: Population and samples – sampling distributions of mean (Known and unknown) proportions, sums and differences: Point estimation – interval estimation – Bayesian estimation.

UNIT IV

Test of hypothesis – mean and proportions – Hypothesis concerning one and two means

– Type I and Type II errors. One tail, two-tail tests. Test of significance – students t-test, f-test, x_2-test. Estimation of proportions.

UNIT V

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

TEXT BOOKS:
1. W. Mendenhall, R.J. Beaver and B. M. Beaver, Introduction to Probability and Statistics, Twelfth Edition, Thomson, 2007
2. Erwin Miller and John E. freund. Probability and Statistics for engineers, 6th edition, Pearson

REFERENCE BOOKS:
1. Hogg R V, and Craig A L, *Introduction to Mathematical Statistics, American Publishing.*
2. Blake I E, *An Introduction to Applied Probability,* John Wiley.
3. Lipschutz S, *Probability (*Schaum Series) Mc Graw-Hill.
4. Montgomery D C, *Introduction to Statistical Quality* Control, Wiley.
5. Montgomery D C, *Design and Analysis of Experiments, 5th* edition, Wiley, 2000.
6. Grant E.L. and Lcavenworth R.S. Statistical Quality Control 7th edition, Mc Graw – Hill 2003.
7. Dr. Shahnaz Bathul, Text Book of Probability and Statistics, VGS Publishers,

MCA 201 B – Statistical Methods for Computer Applications

UNIT – I

Elementary Concepts in Statistics: variables, Statistical Significance, How to measure the magnitude of relations between variables, common general format of most Statistical test, how the level o f Statistical significance is calculated, why the normal Distribution is important. Basic Statistics and Tables: Descriptive Statistics, Correlations, t-test for Independent and Dependent Samples. ANOVA/MANOVA: Overview, complex design, Analysis of Covariance, Multivarariate Designs, Contrast Analysis and post-boc Test.

UNIT - II

Association Rules: Overview Computational Procedures and Terminology, Tabular Representation of Associations, Graphical representations of associations. Boosting Tree: Gradient Boosting trees, Stochastic Gradient Boosting, Stochastic Gradient Boosting Trees and Classification. Canonical Tree: General Ideas, sum scores, canonical roots, number of roots, and extraction of roots.

UNIT - III

CHAID Analysis: Basic tree-Building algorithm, CHAID and Exhaustive CHAID, General Computation Issues of CHAID, CHAID, CART, and QUEST. Classification and Regression Trees: Overview Computational Details, Computational Formulas.

UNIT - IV

Cluster Analysis: Statistical Significance testing, area of application, Joining, Two-way joining, k-Means Clustering, EM Clustering, finding the right number of clusters in k-Means and EM Clustering: V-Flod cross-validation.

UNIT – V

A brief introduction to SPSS: Introduction, Data Entry, Storing and retrieving data files, the statistics menus, the output viewer, the chart editor, programming in SPSS, Data Description and simple inference for continuous data: the Lifespans of rates and ages at marriage in the US: Description of data, methods of analysis, analysis using SPSS, example programming's.

Test Books:

1. Statistical Methods and Applications by Thomas Hill and PAwel Lewicki copyright © 2006 Ist Edi.
2. A Handbook Statistical Analysis using SPSS by Sabine Landau and Brian S. Everitt, copyright © 2004 chapman & Hall/CRC Press LLC.

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MCA 202: DATA STRUCTURES USING JAVA

UNIT I

LINEAR DATA STRUCTURES : Abstract Data Types - Asymptotic Notations: Big-Oh, Omega and Theta – Best, Worst and Average case Analysis: Definition and an example – Arrays and its representations – Stacks and Queues – Linked lists – Linked list based implementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomial addition.

UNIT II

NON-LINEAR DATA STRUCTURES; Trees – Binary Trees – Binary tree representation and traversals – Threaded binary trees – Binary tree representation of trees – Application of
 trees: Set representation and Union-Find operations – Graph and its representations – Graph Traversals – Connected components.

UNIT III

SEARCH STRUCTURES AND PRIORITY QUEUES: AVL Trees – Red-Black Trees – Splay Trees – Binary Heap – Leftist Heap

UNIT IV

SORTING: Insertion sort – Merge sort – Quick sort – Heap sort – Sorting with disks – k-way merging – Sorting with tapes – Polyphase merge.

UNIT V

SEARCHING AND INDEXING: Linear Search – Binary Search - Hash tables – Overflow handling – Cylinder Surface Indexing – Hash Index – B-Tree Indexing.

TEXT BOOK:

1. Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures, Galgotia Book Sorce, Gurgaon, 1976. 2. Gregory L. Heilman, Data Structures, Algorithms and
   Object Oriented Programming, Tata Mcgraw-Hill, New Delhi, 2002.

REFERENCES:

1. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, Second Edition, Tata McGraw-Hill, New Delhi, 1991.
2. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, Data Structures and Algorithms, Pearson Education, New Delhi, 2006.

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MCA 203 OPERATING SYSTEMS

UNIT I

Introduction to Operating Systems, Types of Operating Systems, Computing Environments, Computer system operation, I/O structure, and Hierarchy, Hardware protection, Network structure, Operating system components and services – system calls, Systems programs, System Structure, Virtual machines, System design and Implantation.

UNIT II

CPU Scheduling: Scheduling criteria, Scheduling Algorithms, Multiple processor Scheduling, Real-time scheduling. Process Synchronization:- The critical-section problem, Synchronization hardware, Semaphores, Classic problems of

Synchronization, Critical regions, Monitors. Dead Locks: Deadlock characterization, Deadlock handling, Deadlock prevention, Deadlock avoidance, Deadlock detection, and Recovery.

UNIT III

Memory Management: Swapping, Contiguous memory allocation, Paging, Segmentation with paring Concept of Virtual memory Demand paging Page replacement, Allocation of frames, Thrashing. File System Interface & Implementation: File concept, Access methods, Directory structure, File System Mounting File sharing Protection, File system structure, and implementation, Directory implementation, Allocation methods. Free space management, Efficiency and performance, Recovery.

UNIT IV

I/O Systems: overview, I/O hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O to Hard ware operations, STREAMS, Performance of I/O. Mass Storage Structure:- Disk Structure Disk Scheduling, Disk management, Swap-space Management,
RAID Structure, Disk Attachment, Stable – Storage implementation, Tertiary – storage structure. Protection: Goals, Domain of protection, Access matrix and implementation, Access rights, capability – based systems, Language – based protection.

UNIT V

User authentication, program threats, system threats, security systems Facilities,. Linux system: History, Design principles, Kernel modules, process management, Scheduling Memory Management, File Systems, Input and output, IPC, Network structure, security.

TEXT BOOKS:
1. Silberschatz A, Galvin P.B, and Gaghe G. Operating System Concepts, 6th edition, John Wiley, 2002.
2. Tenenbaum A.S., Modern Operating Systems, 2nd edition, Pearson Education, 2001.

REFERENCE BOOKS:
1. Dhamdhere D.M., Operating Systems – A concept based Approach, Tata McGraw-Hill, 2002.
2. Flym I M, and Mc Hoes A.M., Understanding Operating Systems, 3rd edition, Thomson Brooks/Cole, 2001.
3. Bhatt P.C.P., An Introduction to Operating Systems – Concepts and Practice, PHI, 2003.
4. Harris J.A., Operating Systems, Tata McGraw-Hill (Schaum"s Outlines series), 2002.
5. Remy Card,Eric Dumas,Linux Kernal Book , Orielly

MCA 204 ADVANCED DATABASE MANAGEMENT SYSTEMS

UNIT I

Introduction, Database- System Application – Purpose of Database Systems – View of Data – Database Languages – Relational Databases – Database Design – Object – based and Analysis – Database Architecture. Entity – Relationship mode: Structure of Relational Databases - . Relational Algebra Operations – Modification of the Database.
SQL : Data Definition- Structure of SQL Queries- Set Operations- Aggregate Functions- Nested Sub queries- Complex Queries – SQL Data Types and Schemas- Integrity Constraints-Authorization- Embedded SQL- Dynamic SQL

UNIT II

The Entity – Relationship Model-Constraints-Entity-Relationship Diagrams, Design Issue-Weak Entity Sets-Database Design for Banking Enterprise- The Unified a Modeling Temporal Data- User Interfaces and Tools- Triggers-Authorization in SQL.

UNIT III

OBJECT- DATABASES AND XML: Object-based databases – Complex data types, structured types and inheritance in SQL, table inheritance, array and multiset types in SQL, object identity and reference types in SQL, implementing O-R features, Persistent programming languages, OO vs OR. XML – Structure of XML, Document Schema, Querying and Transformation, API in XML, XML applications.

UNIT IV

Query Processing: Measures of Query Cost-Selection Operation-Sorting-Joint Operation-Evaluation of Expressions-Query Optimization: Transformation of Relational Expressions-Estimating Statistics of Expression Results-Choice of Evaluation Plans.

UNIT V

Transactions: Transaction concept, Transaction State-Implementation of Atomicity and Durability-Concurrent Executions-Serializability-Recoverability-Implementation of Isolation-Testing for Serializability, Concurrency Control: Lock Based Protocols-Timestamp-Based Protocols-Validation-Based Protocols-Multiple Granularity-Multiversion Schemes-Deadlock handling-Insert and Delete Operations-Weak Levels of Consistency-Concurrency in Index Structures, Recovery System: Failure Classification-Storage Structure-Recovery and Atomicity-Log-Based Recovery-Recovery with Concurrent Transactions-Buffer Management-Failure with lose of Nonvolatile Storage-Advanced Recovery Techniques-Remote Backup Systems. ORACLE Backup and recovery utilities.

Book:
1. Silberschatz A. Korth H F, and Sudarsan S, *Database System Concepts*, 5th edition, McGraw-Hill 2002. (Chapters 1to 4, 6 to 10 and 13 to 17)

Reference Books:
1. Date C J, *An Introduciton to Database Systems, 7th edition, Pearson Educaiton, 2000.*
2. Elmasri R, and Navathe S B, *Fundamentals of Database Systems,* 4th edition, Pearson Education, 2004.

3. Ramakrishnan R, and Gehrke J, *Database Management Systems, 2nd edition, McGraw-Hill, 2000.*

4. *Mannino M V, Database Application Development and Design,* McGraw-Hill, 2001.

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MCA 205 DATA SCIENCE ESSENTIALS

UNIT- I

Introduction: What is Data Science? - Big Data and Data Science, Statistical Inference - Populations and samples - Statistical modeling, probability distributions, fitting a model - Intro to R Language.

UNIT-II

Exploratory Data Analysis and the Data Science Process - Basic tools (plots, graphs and summary statistics) of EDA - Philosophy of EDA - The Data Science Process - Case Study: RealDirect (online real estate firm)

UNIT-III

Feature Generation and Feature Selection (Extracting Meaning From Data) - Motivating application: user (customer) retention - Feature Generation (brainstorming, role of domain expertise, and place for imagination) - Feature Selection algorithms – Filters; Wrappers; Decision Trees; Random Forests

UNIT-IV

Data Visualization - Basic principles, ideas and tools for data visualization 3 - Examples of inspiring (industry) projects - Exercise: create your own visualization of a complex dataset

UNIT V

Data Science and Ethical Issues - Discussions on privacy, security, ethics - A look back at Data Science - Next-generation data scientists

Text Book:

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly. 2014.

REFERENCES BOOKS:

1. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press. 2014. (free online)

2. Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. ISBN 0262018020. 2013.

3. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. ISBN 1449361323. 2013.

4. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, Second Edition. ISBN 0387952845. 2009. (free online)

5. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data

Science. (Note: this is a book currently being written by the three authors. The authors have made the first draft of their notes for the book available online. The material is intended for a modern theoretical course in computer science.)

6. Mohammed J. Zaki and Wagner Miera Jr. Data Mining and Analysis: Fundamental Concepts and Algorithms. Cambridge University Press. 2014.

7. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, Third Edition. ISBN 0123814790. 2011.

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MCA 206 LEADERSHIP VALUES

UNIT I

Concept and Nature of leadership: concept and Significance, Importance, evaluations of leadership, Leadership at different levels, Leadership and Gender, Male and Female Leadership styles.

UNIT II

Leadership Qualities: List of Qualities, Charismatic Leadership, working leader, psychopathology of leadership

UNIT III

Leadership in groups: groups, teams, group vs teams and team formation process, stages of group, group dynamics, and managing team performance & team conflicts.

UNIT IV

Leadership ethics: Definition, ethical theories, principles of ethical leadership, core leadership values**:** respect, making a difference, integrity, authenticity, courage, service, humility, wisdom.

UNIT V

Leadership values across globe: leader vs manager, leadership in india, china and America.

Text Books:
1. **Leadership- Philip Sadler**, Fast Track Series, Crest Publishing House.
2. Leadership and Management – Dr. A. Chandra Mohan, Himalaya Publishing House
3. **John C. Maxwell (2014);** "The 5 Levels of Leadership", Centre Street, A division of Hachette Book Group Inc.

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MCA III-Semester

MCA 301: COMPUTER ORIENTED OPERATIONS RESEARCH

UNIT-I

Origin and Development of Operations Research - Nature and Scope of Operations Research-Models and Modeling in Operations Research- Computer Software for Operations Research-Applications of Operations Research-Linear Programming-Model formulation, Graphical Method, Simplex Method, Duality, Revised Simplex Method-Integer Programming Problem using Excel solver.

UNIT-II

Transportation Problem–Transshipment Model–Assignment Problem–Goal Programming -Network Techniques: Shortest-Path Model, Minimum Spanning Tree Problem, Maximum Flow Problem.

UNIT-III

Non-Linear Programming-Unconstrained Optimization, Constrained Optimization with and without inequalities-Kuhn-Tucker Conditions-Graphical Solution of Non–Linear Programming Problem-Quadratic Programming-Separable Programming-Convex and Non-Convex Programming.

UNIT-IV

Queuing Theory-Basic structure of Queuing System-Classification of Queuing Models-Single-Server Queuing Models-Multi-Server Queuing Models-Applications of Queuing Theory-Simulation-Monte-Carlo Simulation-Role of Computers in Simulation-Applications of Simulation.

UNIT – V

Decision Theory-Steps in Decision Theory Approach-Decision-Making Environments-Decision Making under Certainty, Uncertainty and Risk-Decision Tree Analysis-Game Theory.

Text Books:
1. Taha H.A., Operations Research: An Introduction, Prentice-Hall of India
2. S.D.Sharma., Operations Research, Kedar Nath Ram Nath, Delhi

Reference Books:
1. R.Pannerselvam., Operations Research, Prentice-Hall of India
2. J.K.Sharma., Operations Research -Theory and Applications, Macmillian India Ltd
3. Kanti Swarup., P.K.Gupta and Mam Mohan, Sultan chand& Sons
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MCA 302: DATA COMMUNICAITON AND COMPUTER NETWORKS

UNIT – I

Introduction, Network models – Internet model, OSI model Physical Layer: Signals – Analog, Digital, Digital Transmission – Coding, Sampling, Analog Transmission – Modulation of digital and analog signal, Multiplexing – FDM, WDM, TDM, Transmission Media – cable, wireless, Circuit switching and Telephone network, DSL Technology, Cable modem, SONET.

UNIT – II

Data Link Layer: Error detection and correction, Data link control and Protocols – Stop and wait,
Go-back-n, Selective repeat, HDLC, Point to point access, Channelization, LANS – Traditional
Ethernet, Fast Ethernet, Gigabit Ethernet, Wireless LAN's – IEEE 802.11, Blue tooth, Connecting LANs – Connecting devices, Backbone networks, Virtual LANS, Cellular telephony, Satellite networks, Virtual circuit switching, Frame relay, ATM.

UNIT – III

Network Layer: Inter-networks, Addressing, Routing, Network layer Protocols – ARP, IP, JCMP. IPV6, Routing – Introduction, Unicast routing, Protocols – RIP, OSPF, BGP, Multicast Routing, Protocols – DVMRP, MOSPF, CBT, PIM.

UNIT – IV

Transport Layer: Process-to-Process Delivery, UDP, TCP, Data traffic, Congestion and Control, Quality of service (QOS) and techniques to improve QOS, Integrated services, QOS in Switched networks. Security: Introduction. Symmetric-key cryptography, Public key cryptography, Message security, Digital signature, User authentication, Key management, Kerberos. Communication Security, Authentications Protocols, E-mail Security, Web security, Social Issues.

UNIT – V

Application Layer: Design issues, file transfer, access and management. Client-Server model, Socket interface Introduction to DNS, Distribution of name space, . DNS in the Internet. Electronic mail, SMTP, File Transfer, FTP, HTTP, World Wide web.

Text Books:
1. Forouzan B A, Data Communications and Networking, 4th edition, Tata McGraw-Hill, 2007.
2. Tanenbaum A S, Computer Networks, 4th edition, Pearson Education, 2003.

Reference Books:
1. Stallings W, Data and Computer Communications, 7th edition, Pearson Education, 2004.
2. Gallo M A, and Hancock W M, Computer Communications and Networking Technologies, Thomson Brooks/Cole, 2002.
3. Comer D E, Computer Networks – and Internets with Internet Applications, 4th edition, Pearson Education, 2004.
4. Kutose J F, and Ross K W, Computer Networking – A Top-down Approach Fealuring the Internet, Pearson Education, 2001.
5. Tomasi W, Introduction to Data Communications and Networking, Pearson Education, 2004.

MCA 303: SOFTWARE ENGINEERING

UNIT – I

Software Engineering – Introduction, Generic view of process, models, an agile view of process. Software Engineering practice – Software Engineering, communication, planning, modeling, construction practices and deployment.

UNIT-II

System Engineering – Computer-based systems, the system engineering Hierarchy, business process engineering, product engineering and system modeling. Building the analysis model

– Requirement analysis, modeling approaches, data modeling. Behavioral model. The web engineering process, analysis models for web apps.

UNIT –III

Design Engineering-Design process and quality, design concepts the design model, and pattern-used software design. Architectural design – Software architecture, data design, architectural styles and patterns, architectural design mapping data flow into a software architecture. Component-based software engineering, Critical systems development, Software reuse, User interface design, web apps design issues and architecture design.

UNIT –IV

Testing strategies – Strategies and issues, testing strategies for and object-oriented software. Validation testing and system testing. Software testing tactics – Fundamentals, black-box and white-box testing white-box testing basis path testing. Control structure testing, black-box testing, object-oriented testing methods. Testing methods applicable at the class level inter class testing case design. Testing for specialized environments, architectures and applications, web application testing – concepts, testing process, component level testing.

UNIT – V

Product metrics – Software quality, framework, metrics for analysis model design model, source case and testing. Managing software projects – The management spectrum, the W^5 HH principle, metrics in process, software measurement, metrics for software quality integrating metrics within the software process. Estimation – observations, decomposition techniques, empirical models, estimation for object-oriented projects other estimation techniques, project scheduling, risk management, reengineering, Security engineering, Service-oriented software engineering, Aspect-oriented software development.

Text Books:

1. Roger, S, Pressman, Software Engineering, A Practitioner's Approach, Six Edition, McGraw-Hill, International Edition, 2005.
2. Ian Sommerville, Software Engineering, Pearson Education, 8th Edition.

REFERENCE BOOKS:
1. James F Peters, Software Engineering, John Wiley
2. Waruan S Jawadekar, Software Engineering, Tata McGraw Hill, 2004.
3. Carlo Ghezzi, Mehdi Jazayeri, Dino Manrioli, Fundamentals of Software Engineering, PHI, 2001 Pankaj Jalote, An Integrated approach to Software Engineering Narosa

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MCA 304: COMPUTER GRAPHICS

UNIT I

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, Raster-scan systems, random scan systems, graphics monitors and work stations and input devices Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

UNIT II

2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. 2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT III

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. Basic illumination models, polygon rendering methods.

UNIT IV

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping

UNIT V

Digital Image Processing: Introduction, fundamental steps, components, sampling and quantization, image enhancements.

Text Books:
1. Donald Hearn and M.Pauline Baker, Computer Graphics C Version, Second Edition, Pearson Educations.2005.
2. Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, SecondEdition,PearsonEducation/PHI.

Reference Books:
1. Steven Harrington (1987), Computer Graphics – A Programming Approach, Second Edition, Mc Graw – Hill International Editions.

2. William M. Newman and Robert F. Sprowli (1979), Principles of Interactive Computer Graphics, second Edition, Mc Graw – Hill International Editions.
3. FS Hill Jr. Cmputer Graphics using Open Gl, second Editions, 2005.
4. J.D.Foley Wesley,199, second Edition in C.R.C.S Asthana and N.K.Sinha "Computer Graphics for Scientists and Engineers" New Age International Limited, Second
Revised Edition.

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MCA 305: TECHNICAL COMMUNICATION AND COMPUTER ETHICS

UNIT I
Phonetics and Spoken English, The Phonemes, The Syllable, Prosodic Features. The sounds of English – Voweis and Consonants, Word Accent, Features of Connected Speech, Pronunciation, spelling, Suggestions for improvement of Indian English. Effective Speaking – Oral Presentations. Listening Comprehension. Reading Comprehension.

UNIT II
Introduction to Technical Writing – Objective of technical writing Audience Recognition and Involvement, Preparation of Resume, Techniques for writing effective E-mail. Writing User Manuals, Writing Technical Reports and Summaries.

UNIT III
Introduction to Computer Ethics – Policy vacuum, Moral and Legal issues, Computer Ethics Professional Ethics – Characteristics of professions, Conflicting Responsibilities, Code of Ethics and Professional conduct. Philosophical Ethics – Ethical Relativism, Utilitarianism, Rights individual and Social Policy Ethics.

UNIT IV
Ethics Online – Hacking and Hacker Ethics computer crime Netiquetie. Privacy – Computers and Privacy issue. Proposals for better Privacy Protection property Rights in Computer Software – Current Legal Protection. Software Piracy, The Moral question.

UNIT V
Accountability – Buying and Selling Software – Accountability issues, Social Change, Democratic values in the Internet, Freedom of Speech, Future issues. The Rights and Responsibilities of Engineers – Professional Responsibilities, Ethics and Rights Ethics in Research and Experimentation.

Text Books:
1. Gerson S.J., and Gerson S.M. Technical Writing – Process and product, 3rd edition, Pearson Education Asia, 2001.
2. Johnson D.G. Computer Ethics 3rd edition, Pearson Education Asia. 2001.
3. Bansal R.K. and Harrison J.B. Spoken English 2nd Edition, Orient Longman,

1994.
4. Fleddermann C.B. Engineering Ethics 2nd edition, Pearson Education 2004.

References Books:

1. Krishna Mohan, and Meenakshi Raman, Effective English Communciation, Tata McGray Hill, 2000.

2. Martin M.W. and Schinzunger R. Ethics in Engineering 3rd Edition Tata Mc-Gray-Hill, 1996.

3. Division of Humanities and Social Sciences, Anna University, English for Engineer and Technologists, Vols, 1and 2nd edition, Orient Longman, 2002.

4. NHT Ethics and Security Management on the Web, Prentice – Hall of India 2003.

5. Rutherford A.J. Basic Communication Skills for Technology 2nd edition Pearson Education Asia, 2001.

6. Jayanthi Dakshina Murthy, Contemporary English Grammar, Book Palave, Delhi.

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MCA IV-Semester
MCA 401: DATA WAREHOUSING AND DATAMINING

UNIT – I
Data Warehousing & OLAP Technologies, Basic Data Mining Tasks: Classification-Regression-Time series Analysis-Prediction-Clustering-Summarization-Association rules-Sequence discovery – Data mining Versus Knowledge discovery in databases-the development of Data Mining-Data Mining issues-Data mining Metrics-Social Implications of Data Mining-The future. Data Preprocessing.

UNIT II
Basic Data mining Tasks, Principles of dimensional modeling-design decisions, Dimensional Modeling basics, E-R Modeling versus Dimensional modeling-use of case tools-The star schema-Review of a simple STAR schema, inside a Dimension table, inside the fact table, the fact less fact table, Data Granularity. Star Schema keys-primary keys, surrogate keys, foreign keys. Advantages of star schema. Dimensional Modeling: Updates to the dimensional tables-Miscellaneous Dimensions-The Snowflake schema-Aggregate fact tables-Families of stars.

UNIT-III
Classification: Introduction-Issues in classification-Statistical Based Algorithm-Regression-Bayesian Classification-Distance based algorithm-Simple approach-K nearest approach-Decision tree based algorithms-ID3-C4.5 & C5.0-CART-Scalable DT Techniques-Nueral network based algorithms-Propagation-NN Supervised Learning-Radial basis function works-Perceptrons-Rule based algorithms.

UNIT – IV
Clustering: Introduction-Similarity & distance measures-outliers-Hierarchial algorithms-agglomerative algorithms-Divisive clustering-Partitional algorithms-Minimum spanning tree-Squared error clustering algorithm-K-means clustering-nearest neighbour algorithm-PAM algorithm-Bond energy algorithm-Clustering with Genetic algorithms-Clustering with neural networks-Clustering large databases-BIRCH- DBSCAN-CURE algorithm-Clustering with categorical attributes.

UNIT - V
Associate Rules:- Introduction-Large item sets-Basic Algorithms-Apriori Algorithm-Sampling algorithm-Partitioning- Parallel and Distributed algorithms-Data Parallelism-Task parallelism-Comparing Approaches- Incremental Rules-Advanced Association Rule Technique-Generalized association rules-Multiple level association rules-Multiple –level Association rules-Quantitative association rules-Using multiple minimum supports-Measuring the Quality of a Rules. Mining objects-spatial, multimedia & text mining.

Text Books:
1. Data Mining – Introductory & Advanced topics by Margaret H. Dunham,. Pearson Education publishers.
2. Data mining concepts & techniques-Jiawei Han & Micheline Kamber
3. Fundamentals of Data warehousing –Paul raj Ponniah

Reference Books:

1. Data Mining – Concepts and Techniques by Han and Kamber,2001, Morgan Kaufmann Publishers
2. Oracle 8i – Data Warehousing by Cohen, Abbey, Taub, Tata McGraw Hill

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MCA 402: SYSTEMS PROGRAMMING

UNIT I

Background introduction, system software and machine architecture, SIC, RISC, and CISC architecture. Assembler: basic assembler functions, machine dependent and independent assembler features, assembler design options, and implementation examples.

UNIT II

Loading and linkers basic loader junction, machine dependent and independent loader features, loader design options and implementation examples.Macro processors, basic macro processor functions machines – independent macro processor features, macro processor design options, implementation examples.

UNIT III

Compilers: basic compiler functions, machine dependent and independent compiler features, compiler design options and implementation examples. Other system software: text editors and interactive debugging systems

UNIT-IV

Introduction to Device Drivers, Design issues-Types of Drivers, Character driver-1 and Design issues, Character Driver-2- A/D converter and its design issues, Block driver-1 and its design issues- RAM DISK driver-Anatomy-Prologue of drivers and programming Considerations.

UNIT-V

Introduction to Linux- Linux Architecture- X-windows- Linux administration tools - Commands to use Linux OS- Executing Linux Shell scripts – Shell Programming concepts-Shell scripts.

Text Books:

1. Leland .Beck, System Software: An Introduction to systems programming :3/e, Pearson Educations Asia,2003.
2. George pajari, Writing Unix Drivers, Addison – Wesley,1991.
3. Richard Petersen, Linux complete Reference, McGraw Hill Education (India) Private Limited; 6 edition (21 November 2007

Reference Books:

1. Dhamdhere, System programming and operation Systems Book 2/E, Tata Mc Graw, Hill, 1999
2. A.V. Aho, Ravi Sethi and J D Ullman , "compilers, Techniques and Tools", Addison
   Wesley, 1986.

3. Jhon J. Donovan, System Programming Tata Mc Graw Hill 2005.

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MCA 403 A: WEB PROGRAMMING

UNIT-I

Introduction to Internet-Browser Architecture-IE, Chrome-Search Engines-Introduction to HTML-5-HTML-5 Tags-Audio, Video Tags – HTML-5 Forms-Controls-CSS Styling-CSS Tags-Attributes.

UNIT-II

Java Script-JQuery- JavaScript Programming Scripts- Control structures-Functions-Document, Browser, Date, Math, String objects-Events- JQuery Libraries-JQuery Objects, Functions – JQuery Events-Animations.

UNIT-III

AJAX Concepts- Simple AJAX objects-Ajax Libraries-Examples, Webservers IIS, Tomcat-Hosting Website in a Webservers

UNIT-IV

Introduction to PHP-Control Structures-Arrays-Functions-Database connectivity-Introduction to ZEND Framework and applications

UNIT-V

Introduction to Java Servlets, Servlet classes and interfaces - Java Database Connectivity- Introduction to JSP-Java Server Page scriptlets -JSP Objects-JSP Web applications

Text Books:
1. Deitel, Deitel and Goldberg Internet & World Wide Wide how to program"by End.
   Pearson Education
2. Ivan Bayross, Webenavled commercial Application Development in Java 2.0 BPB.
3. Nicholas C. Zakas.,Jeremy McPeak,Joe Fawcett, Professional AJAX,2nd Edition, Willey publishing
4. HTML 5 Black book, Kogent Learning Solutions Inc.

REFERENCE BOOKS:
1. Raj Kamal Internet and web Technologies, Tata Mc Graw Hill, 2002.
2. Chirs Bates, Web Programming, John Wiley, 2nd Edition
3. E.V.Kumar and S.V.Subramanyam, Web Services. Tata Mc Graw Hill, 2004.

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MCA 403B - Artificial Intelligence

UNIT – I

Introduction about Artificial Intelligence (AI): Problem and search – what is AI technique. Criteria for success; problems, problem space and search – Defining the problem as a state space search, Production systems, Problem characteristics. Production system characteristics.

UNIT- II

Heuristic search techniques; Knowledge representation – Knowledge representation issues, Using predicate logic, Resolution principle; Representing knowledge using rules – Forward Vs backward reasoning Symbolic reasoning under uncertainty – Non monotonic reasoning. Statistical reasoning.

UNIT – III

Different knowledge representation schemes – Semantic nets. Marvun Minsjy's frames, Conceptual dependency theory, Scripts; Understanding – what is understanding? What makes understanding hard? Understanding as constraint satisfaction Waltz's algorithm.

UNIT – IV

Natural language processing – Overview of linguistics. Grammars and languages, Basic parsing techniques, Transitional networks, Semantic analysis and representation structures, Natural language generation, Natural language systems; General concepts in knowledge acquisition - Types of learning, General learning model, Performance measures; Early work in machine learning – Perceptions, Genetic algorithms, Intelligent editors.

UNIT – V

Expert system architecture – Characteristic features of expert systems, history, Applications, Rule based system architecture, Expert system shells; Pattern recognition – The recognition and classification process, Learning classification patterns, Recognizing and understanding speech; Perception and Action; Features of AI Programming language PROLOG.

Text Books:

1. Elaine Rich and Kevin Knight " Artificial Intelligence", Tata Mc Graw – Hill, 2nd Edn, 2002
2. Dan W.Patterson,"Introduction to Artificial Intelligence & Expert Systems".1999.

Reference Books:

1. Swart Russell and Peter Norving, Artificiao Intelligence, Pearson Education.2nd Edition.
2. Patrick Henry Winston, "Artificial Intelligence" 3rd Edn,PHI,1999.
3. George F.Luger,"Artificial Intelligence – 3structures and strategies for complex Problem

solving" Pearson Education, 4th Edn,2001.

4. Nils Jenison, Artificial Intelligence,Morgan Kaufmann,2000.

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MCA 403 C - SOFTWARE TESTING

UNIT-I

Building a software Testing strategy, software Test Design Techniques, software Testing tools and selection of Test Automation products.

UNIT-II

Software Testing Life cycle and software testing process, testing Effort estimation and test planning, software test effort estimation technique.

UNIT-III

Pre-Development testing: requirements and Design phase, Best practices in program phase: UNIT Testing, System Testing and integration testing, case study on acceptance testing.

UNIT-IV

Implementing and Effective Test Management Process, Building and Effective test organization, performance issues and optimization techniques.

UNIT - V

Testing of web Based Applications, Testing of Embedded software systems, testing Applications for security, testing Metrics and Bench Marks.

Text book:

1. Renu Rajani and pradeep Oak,, software testing, tata Mc Graw Hill.

References:

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MCA 404 A: E-COMMERCE

UNIT – I

Electronic Commerce: Electronic Commerce Framework; Electronic Commerce and Media Convergence; The Anatomy of E-Commerce Application; Electronic Commerce Organization Applications- The Network Infrastructure for Electronic Commerce: Market Forces Influencing the I- Way; Components of the I Way; Network Access Equipment; the Last Mlle: Local Roads and Access Ramps; Global Information Distribution: Networks: Public Policy Issues Shaping the I-Way. Case study: B2B ecommerce

UNIT – II

The Internet as a Network Infrastructure: The Internet Terminology; Chronological History of the Internet NSFNET: Architecture and Components: Globalization of the Academic Internet; Internet Governance: The Internet Society –An Overview of Internet

Applications –Electronic Commerce; World Wide Web(WWW) as the Architecture: Web Background: Hypertext Publishing; Technology behind the Web: Security and the Web-Consumer-Oriented Electronic Commerce: Oriented Applications; Mercantile Process

Models Mercantile Models from the Consumer's Perspective; Mercantile Models from the Merchant's Perspective.

Case study: E-Commerce/High Security (Pci)

UNIT – III

Electronic Payment Systems: Types of Electronic Payment Systems; Smart Cards and Electronic Payment Systems; Credit Card-Based Electronic Payment systems: Risk and Electronic Payment Systems Designing Electronic Payment systems – Inter organizational Commerce and EDI: Legal, security, and Privacy Issues:EDI and Electronic Commerce – EDI Implementation, MIME, and Value- Added Networks : Standardization and EDI;EDI Software Implementation: EDI Envelope for Message Transport: Value- Added Networks (VANs); Internet – Based EDI.Case study: Social Media Marketing

UNIT – IV

Intra organization Electronic Commerce: Internal Information System: Macro forces and Internal Commerce; Work-Flow Automation and Coordination; Customization and Internal Commerce; Supply Chain Management (SCM) – The Corporate Digital Library: Dimensions of Internal Electronic Commerce Systems; Making a Business Case for a Document Library; Types of Digital Document Library; Types of Digital Documents; Issues behind Document Infrastructure; Corporate Data Warehouses.Case study: Email Marketing, Email Personalization

UNIT - V

M-Commerce: Introduction to Mobile Commerce, Limitations, history, applications, architecture, transaction models, payment methods, advantages, disadvantages Case study: Mobile app marketing case study: O2 Priority Moments gets small businesses on side

Text book:

1. Ravi Kalakota and Andrew B.Whinston.Frontiers of Electronic Commerce, Pearson Education.

REFERENCE BOOKS:

1. Henry Chan, Raymond Lee. Tharan Dillan and E.Chany,E-Commerce, Wiley,2003.

2. Danjel Minoli and Emuna Mimoli, Web Commrece Technology, Tata MicGraw Hill, 1999.

3. Marilyn Greenstein and Todd M Feinman, aElectronic Commerce, TaraMcGraw Hill Edition.

4. Craig Patridge, Gigaibit Networking, Addison – Wesley, 1994

5. PaulM-Commerce: Book Your Business with the Power of Mobile Commerce

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MCA 404 B - Cyber Security

UNIT I

FUNDAMENTALS OF CYBER SECURITY: Introduction-Cyber Security and its problem-Intervention Strategies: Redundancy, Diversity and Autarchy.

UNIT II

ISSUES IN CYBER SECURITY: Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right-source of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Loss.

UNIT III

INTELLECTUAL PROPERTY RIGHTS: Copy Right-Source of risks, Pirates, Internet Infringement, Fair Use, postings, Criminal Liability, First Amendments, Losing Data, Trademarks, Defamation, Privacy-Common Law Privacy, Constitutional law, Federal Statutes, Anonymity, Technology expanding privacy rights.

UNIT IV

PROCEDURAL ISSUES: Duty of Care, Criminal Liability, Procedural issues, Electronic Contracts & Digital Signatures, Misappropriation of information, Civil Rights, Tax, Evidence.

UNIT V

LEGAL ASPECTS OF CYBER SECURITY: Ethics, Legal Developments, Late 1990 to 2000,Cyber security in Society, Security in cyber laws case. studies, General law and Cyber Law-a Swift Analysis.

Text book:

1. Jonathan Rosenoer,"Cyber Law: The law of the Internet", Springer-Verlag, 1997.

REFERENCE BOOK:
1. Mark F Grady, Fransesco Parisi, "The Law and Economics of Cyber Security",
Cambridge University Press, 2006.

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MCA 404C - Neural Networks

UNIT I

INTRODUCTION: Neural network, Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks, LEARNING PROCESS, Error Correction learning, Memory based learning, Hebbian learing.

UNIT II

LEARNING PROCESS: Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process, SINGLE LAYER PERCEPTRONS – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception – convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment.

UNIT III

MULTILAYER PERCEPTRON – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection, BACK PROPAGATION - back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning.

UNIT IV

SELF ORGANIZATION MAPS – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification, Hierarchal Vector quantilizer, contexmel Maps.

UNIT V

NEURO DYNAMICS – Dynamical systems, stavility of equilibrium states, attractors, neurodynamical models, manipulation of attractors' as a recurrent network paradigm

HOPFIELD MODELS – Hopfield models, computer experiment

TEXT BOOK:
1. Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2nd Edition 2004

REFERENCE BOOKS:
1. Artificial neural networks - B.Vegnanarayana Prentice Halll of India P Ltd 2005
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003
3. Neural networks James A Freeman David M S kapura Pearson Education 2004
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MCA 405 A: ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT I

Accounting Concepts – Double Entry System – Journal – Ledger – Trial Balance – Subsidiary Books – Final accounts

UNIT II

Cost Accounting: Nature and significance – Cost classification and Analysis – Marginal Costing

UNIT III

Budget – Budgetary control – standard costing – Finance Function

UNIT IV

Financial Decision Making – Financial Analysis – Working Capital Management – Capital Budgeting.

UNIT V

Funds flow Analysis – Cash flow Analysis - Ratio Analysis-

Text Books:
1. Rajeswara Rao K and Prasad G, Accounting & Finance (MCA), Jai Bharat Publishers, Guntur
2. Jain and Narang, *Accountany Vol.* Kalyani Publishers.
3. Jain and Narang, *Cost Accounting*, Kalyani Publishers.
4. Sharma R K, and Gupta S K, *Management Accounting*, Kalyani Publishers.
5. Pandey I M, *Financial Management*, Vikas Publication.

Reference Books:
1. Grewal Ts. *Introduction to Accountancy,* S Chand & Company Ltd, 1999.
2. Khan M K. and Jain P K, *Financial Management, 3rd* edition, Tata McGraw-Hill, 1999.
3. Van Horne J C, *Financial management and Policy,* 12th edition, PHI, 2002.
4. Khan M K, and Jain R K, *Management Accounting,* 3rd edition, Tata McGraw-Hill, 1999.
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MCA 405B - Accounting Essentials for Computer Applications

UNIT I

Introduction to accounting Packages Ms Excel as Accounting tool Features of MS Excel Function wizard Different categories of functions Date, numeric string, Accounting and Misc. Functions. An overview of Accounting functions Auditing Tool in MS Excel.

UNIT II

Annual budgeting applications of spreadsheet preparation of cash budget preparation of Production budget - preparation of Flexible Budget Preparation of projected profit and loss statement and proforma balance sheet. Introduction to Tally, Tally Features.

UNIT III

Cost Volume Profit Applications of Computer spreadsheet Pricing and product decisions including special order pricing, product addition and deletion and make or buy decisions.

UNIT IV

Financial accounting software package features of an accounting package voucher Entry Ledger preparation of Trail Balance, Profit and Loss Account and Balance using Tally. Sheet under specific package environment. Inventory accounting software package Basic Features Economic order quantity Maintenance of stock levels Stock valuation and reporting using Tally.

UNIT - V

Problems of Accounting Software Packages Security Problems Power problems Data integrity problems Computer virus problems of system adoptions.

Text books :
1. Horngreen Introduction to Management Accounting, Prentice Hall
2. Smith, J.L. Keith, R.M. and Stemphens, W. L. Managerial Accounting, McGraw Hill

Reference Books
1. Guy Hart Davis, The ABCs of Microsoft Office, BPB Publications
2. Computer Accounting with Tally 7.2 Paperback – 2006 by Firewall Media
3. Implementing Tally 9/7.2/6.3 A.K.Nandhini ,K.K.Nandhini-First Edition 2007 BPB publications

MCA V-Semester

MCA 501 : BIG DATA AND ANALYTICS FOR BUSINESS INTELLIGENCE

UNIT-I
What is Big Data - Varieties of Data - Unstructured data – Trends in Data Storage-Industry Examples of Big Data.

UNIT-II
Big data Technology – New and older approaches- Data Discovery – Open source technologies for Big Data Analytics- Cloud and Big Data –Big Data Foundation-Computation-Limitations- Big Data Emerging Technologies

UNIT-III
Business Analytics- Consumption of Analytics- Creation to Consumption of Analytics-Data visualization by Organizations – 90/10 rule of critical thinking – Decision sciences and analytics-Learning over knowledge-Agility-Scale and convergence-Privacy and security in Big Data.

UNIT-IV
Predictive Analytics –Linear Regression – Decision trees-Neural networks-Classification trees-Ensemble methods-Association Rules-Segmentation, Sequence Rules, Social Network analytics.

UNIT-V
Hadoop – Components of Hadoop – Hadoop File System –Hadoop Technology Stack-Dataware housing Hadoop Concepts-Applications of Hadoop using PIG,YARN,HIVE.

Text Book:
1. Micheal Minnelli,Ambiga Dhiraj,Chambers, *Big Data and Big Analytics*, Willey and Sons Inc,.

Reference Books
1. Bart Beasens, *Analytics in Big Data World,* Willey and Sons Inc
2. Sameer Wadker,Madhu Sidhalingaiah and Jason Winner,*Apache Hadoop, APress*
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MCA 502 - Cloud Computing

UNIT I

CLOUD ARCHITECTURE AND MODEL Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models: Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public Vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II

VIRTUALIZATION Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

UNIT III

CLOUD INFRASTRUCTURE Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT IV

PROGRAMMING MODEL Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

UNIT V

SECURITY IN THE CLOUD Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

Text Book:
1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

REFERENCES
1. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
3. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011.

4. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
5. James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.
6. Katarina Stanoevska-Slabeva, Thomas Wozniak, Santi Ristol, "Grid and Cloud Computing – A Business Perspective on Technology and Applications", Springer.
7. Ronald L. Krutz, Russell Dean Vines, "Cloud Security – A comprehensive Guide to Secure Cloud Computing", Wiley – India, 2010.
8. Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, 'Mastering Cloud Computing", TMGH,2013.
9. Gautam Shroff,Enterprise Cloud Computing,Cambridge University Press,2011
10. Michael Miller, Cloud Computing,Que Publishing,2008
11. Nick Antonopoulos, Cloud computing,Springer Publications,2010

MCA 503 A: USER INTERFACE DESIGN

UNIT – I

Human factors of interactive software goals of system engineering and user-interface design, motivations, accommodation of human diversity goal for out profession. Theories, principles, and guidelines – High-level theories, object-action interface model Principles, guide links for data display and data entry, balance of automation and human control. Managing design processes – Usability, design pillars, development methodologies, ethnographic observation, usability testing, surveys, and continuing assessments – expert reviews, usability testing and laboratories, surveys acceptance tests, evaluation during active use, and controlled psychologically oriented experiments.

UNIT – II

Software tolls – Specification methods, interface- building tools and evaluation and critiquing tools. Direct manipulation and virtual environments – examples, explanations, programming, visual, thinking and icons Home automation, remote direct manipulation, visual environments. Menu selection, form fillin, and dialog boxes – Task

– related organizations item presentation sequence, response time and display rate, fact movement through menus, menu layout, form fill in, and dialog boxes. Command and natural languages – Functionality to support users tasks, command – organization strategies, the benefits of structure, naming and abbreviations, command menus, natural language in computing.

UNIT – III

Interaction Devices – Keyboards and function keys, pointing devices, speech recognition digitization and generation. Image and video displays, printers. Response time and display rate-Theoretical foundations, expectations and attitudes, user productivity, variability. Presentation styles: Balancing function and fashion – error messages, No anthropomorphic design, display design, color, Printed manuals, Online Help and tutorials – Reading from paper versus form displays, preparation of printed manuals, and preparation of online facilities.

UNIT – IV

Multiple – Window strategies – Individual – Window design, multiple-window design, Coordinator by tightly – coupled windows. Image browsing and tightly –coupled windows, personal role management and elastic windows. Computer-supported cooperative work-goals of cooperation, Asynchronous Interaction: Different time and place, Synchronous Distributed: Different place, same time, face to face: same place, same time, Applying CSCW to Edition, Information search and visualization – Database Query and phrase search in textual documents, multimedia document searches, information visualization. Advanced filtering. Hypermedia and the world wide web (www).

UNIT – V

Introduction to Dot Net technology c#.Net Language – Control structures – GUI controls

– Database GUI Controls and its connectivity to databases – ASP.Net Fundamentals and Web pages Interface designing.

Text Books:
1. Ben Shriderman, Designing the user Interface, strategies for effective human-Computer introduction Third Edition, Pearson Education, 2004, (For UNITs I, II, III and IV).
2. Beginning .NET 2.0 by wrox publications (For UNIT V).

Reference Books:
1. Hix, Deborah and Hartgon, H.RR X; Developing use Interfaces, John Wiley, 1993.
2. Galitz, Wilbert O., It's Time to Clear Your Windows: Designing GUIs that Work, John Wiley and Sons, New York(1994)
3. ASP.NET 2.0 Black Book , Dreamtech publications.
4. VB.NET 2.0 Black Book, Dreamtech publications.

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MCA 503 B: Cryptography and Network Security

UNIT I

Cryptography – Terminology, Conventional Encryption Model, Steganography, Classical Encryption Techniques, DES Data Encryption Standard, Block Cipher Design principles and Modes of Operation.

UNIT – II

Conventional Encryption Algorithms: Triples DES, International Data Encryption Algorithm, Blowfish, RC5, Characteristics of advanced symmetric Block Ciphers, Confidentiality using Conventional Encryption.

UNIT – III

Public-Key Cryptography, Introduction to Number Theory: Prime Numbers, Modular Arithmetic, Euler's Theorem, Primary and Factorization, Discrete Logarithms; Message Authentication and Hash Functions – Hash and MAC algorithms.

UNIT- IV

Digital Signatures and authentication Protocols, Digital Signature Standard, Network Security Practice, Authentication Applications. Basic overview of Electronic Mail

Security: pretty Good Privacy's/MIME: IP Security, Web Security – Intruders, Viruses and Worms –Firewalls.

UNIT – V

Mobile Security, Risk Model, EcoSystem, Service Risks, App Risks, Countermeasures-Cloud Computing Security- Threats-Security in Cloud-Security at service layers.

Text Books
1. "Cryptography and Network Security" by John Wiley, Edn,.2001
2. Neil Bergman(Author), Mike Stanfield (Author), Jason Rouse (Author), Joel
   Scambray "Hacking Exposed Mobile: Security Secrets & Solutions", McGraw hill Ltd.
3. James Ritting House,Ransome,Cloud Computing, Implementation, Management and security, CRC Press

REFERENCE BOOKS:
1. Bruce Schneier, Applied Cryptography, John Wiley, Second Edn,2001.
2. Charke Kaufman, Rodia Perlman and Mike Speciner, Network Security
3. R.Bragg, Markphodes-ousley, Keith Staasibers, Network security, TataMcGraw Hill.2004
4. Cheswick, Wand Bellovin,S.Fire walls and Internetr Security,Addison-Wisley,1994.

MCA 503C - Mobile App Development

UNIT I

Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications

UNIT II

BASIC DESIGN 8 Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

UNIT III

ADVANCED DESIGN 8 Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

UNIT IV

TECHNOLOGY I - ANDROID Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

UNIT V

TECHNOLOGY II - IOS Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.

Text Book:
1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
2. Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice",
   DreamTech, 2012

REFERENCES:
1. http://developer.android.com/develop/index.html
2. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, "Beginning iOS
3. Development: Exploring the iOS SDK", Apress, 2013.

MCA 503D: IT in Forensic Science

UNIT-I

Justice and Science-evidence origins types and admissibility-Crime scene, Blood stain patterns

UNIT-II

Forensic Death investigation-forensic anthropology-Entomology

UNIT-III

Forensic biology- Identification of Blood body fluids-DNA typing -Forensic Chemistry-Seized drug analysis -Arson fire explosives

UNIT-IV

Pattern and impression evidence-Finger prints - Tread impressions-Trace evidence-questioned documents

UNIT-V

Engineering and computing -forensic engineering and Forensic computing.

Text books:

1. Stuart H James,Jon Nordy,Suzzane Bell, Forensic Science, An introduction to scientific and Investigative Techniques-, Tayler and Francis Group

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MCA 504 A: IMAGE PROCESSING

UNIT-I

Digital image Processing-The Origins of Digital Image Processing-Example Fields that use digital image processing- Fundamental Steps in Digital Image Process Components of an image processing system summary-Elements of Visual Perception- I and the Electromagnetic Spectrum-image Sensing and Acquisition-Image Sampling Quantization-Some Basic Relationships between Pixels-Linear and Nonlinear Operation.

UNIT-II

Background-Some Basic Gray level Transformations-Histogram Processing-Enhancer Using Arithmetic/ Logical Operations- Basis of spatial filters – smoothing spatial Filters

– smoothing spatial filter sharpening spatial filters-Combining spatial Enhancement Methods. Color Fundamental color Models-pseudo color image processing – Basis of full-color image processing- Transformations smoothing and sharpening – color segmentation – noise in color image color image compression.

UNIT – III

Fundamentals – image compression Models – Elements of information theory – Error-Compression – image Compression Standards.

UNIT-IV

Detection of Discontinuities – Edge Linking and Boundary Detection – Threshold-Regarding based Segmentation- Segmentation by morphological watersheds-the Use of Motion Segmentation.

UNIT – V

Representation – Boundary Descriptors – Regional Descriptors – Use of Principal – Common for Description – Relational Descriptors – Scope and relevance Handwriting – Finger Print – 1 Other state – of the art Technologies.

Text book:

1. Gonzalez and Woods, Digital Image Processing, Second Edition, Pearson Education.

REFERENCE BOOKS:

1. Introductory Computer Vision & Image Processing, Mc Graw Hill.
2. Ramesh Jani et al, Machine Vision, McGraw Hill.
3. B.Chandra, D.Dutta Majmlar, Digital Image Processing PHL
4. 4. G.W.Awlock & R.Thomas, Applied Degital Image Processing, McGraw Hill.
5. Picks, Digital Image Processing, John Wiley.
6. M.Sonka, Image Processing Analysis & Machine Design, Thomson Learning.
7. Anil K Jain, Fundamentals of Digital Image Processing, Pearson Education, 2004.

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MCA 504B - MULTIMEDIA SYSTEMS

UNIT-I

Introduction to Multimedia: media and Data Streams: Medium Main Properties of Multimedia System-Multimedia-Traditional data streams Characteristics-Data streams Characteristics for continuous Media – Information UNITs-Sound/Audio: Basic Concepts-Computer Image Processing.

UNIT-II

Video and Animation: Basic Concepts-Television-Computer based Animation-Data Compression: Storage Space-Coding Requirements-Source, Entropy and Hybrid coding-some Basic Compression Techniques-JPEGH.261-MPEG_DVI.

UNIT-III

Optical storage media: Basic Technology-Video Disks and other WORMs Compact Disk Read Only Memory-CD-ROM Extended Architecture-Further CD-ROM Technologies-Computer Technology: Communication Architecture-Multimedia Workstation.

UNIT-IV

Multimedia Operating Systems: Real Time-Resource management-Process Management-File Systems-Additional Operating System issues-system Architecture.

UNIT – V

Multimedia Communication Systems: Application Subsystem – Transport Subsystem-Quality subsystem Quality of service and Resource Management-Database Systems: Multimedia Database Management System-Characteristics of MDBMS-Data Analysis – Data Structure*Operations on Data Integration in a Database Model.

Text Book:

1. Ralf Steinmetz and Klara Nahrstedt, Multimedia: Computing, Communications and Applications, pearson Education Asia.

REFERENCE BOOKS:

1. Tay Vaughan, Multimedia Making it work, Tata Mc Graw-Hill, Edition, 2001
2. Jeffcoate, Multimedia in practice Technology and Application, Prentice Hall, 1995
3. John F. Koeel Buford, Multimedia systems, Addison Wesley, 1994.
4. Fred Halsall, Multimedia communications, Pearson Edition 2001.
5. Prabhat K Andleigh and Kiran Thatkar, Multimedia systems Design, PHI 2005.

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MCA 504C Natural Language Processing

UNIT I

Introduction and Overview Natural Language Processing, hands-on demonstrations. Ambiguity and uncertainty in language. The Turing test. Regular Expressions Chomsky hierarchy, regular languages, and their limitations. Finite-state automata. Practical regular expressions for finding and counting language phenomena. A little morphology. Exploring a large corpus with regex tools. Programming in Python An introduction to programming in Python. Variables, numbers, strings, arrays, dictionaries, conditionals, iteration. The NLTK (Natural Language Toolkit) String Edit Distance and Alignment Key algorithmic tool: dynamic programming, a simple example, use in optimal alignment of sequences. String edit operations, edit distance, and examples of use in spelling correction, and machine translation.

UNIT II

Context Free Grammars Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-down parsing, bottom-up parsing, and the problems with each. The desirability of combining evidence from both directions Non-probabilistic Parsing Efficient CFG parsing with CYK, another dynamic programming algorithms. Earley parser. Designing a little grammar, and parsing

with it on some test data. Probability Introduction to probability theory Joint and conditional probability, marginals, independence, Bayes rule, combining evidence. Examples of applications in natural language. Information Theory The "Shannon game"--motivated by language! Entropy, cross-entropy, information gain. Its application to some language phenomena.

UNIT III
Language modeling and Naive Bayes Probabilistic language modeling and its applications. Markov models. N-grams. Estimating the probability of a word, and smoothing. Generative models of language. Part of Speech Tagging and Hidden Markov Models , Viterbi Algorithm for Finding Most Likely HMM Path , Dynamic programming with Hidden Markov Models, and its use for part-of-speech tagging, Chinese word segmentation, prosody, information extraction, etc.

UNIT IV
Probabilistic Context Free Grammars Weighted context free grammars. Weighted CYK. Pruning and beam search. Parsing with PCFGs A tree bank and what it takes to create one. The probabilistic version of CYK. Also: How do humans parse? Experiments with eye-tracking. Modern parsers. Maximum Entropy Classifiers The maximum entropy principle, and its relation to maximum likelihood. Maximum entropy classifiers andtheir application to document classification, sentence segmentation, and other language tasks

UNIT V
Maximum Entropy Markov Models & Conditional Random Fields Part-of-speech tagging, noun-phrase segmentation and information extraction models that combine maximum entropy and finite-state machines. State-of-the-art models for NLP.Lexical Semantics Mathematics of Multinomial and Dirichlet distributions, Dirichlet as a smoothing for multinomial's. Information Extraction & Reference Resolution- Various methods, including HMMs. Models of anaphora resolution. Machine learning methods for co reference.

TEXT BOOKS:
1. "Speech and Language Processing": Jurafsky and Martin, Prentice Hall
2. "Statistical Natural Language Processing"- Manning and Schutze, MIT Press
3. "Natural Language Understanding". James Allen. The Benajmins/Cummings
   Publishing Company

REFERENCES BOOKS:
1. Cover, T. M. and J. A. Thomas: Elements of Information Theory. Wiley.
2. Charniak, E.: Statistical Language Learning. The MIT Press.
3. Jelinek, F.: Statistical Methods for Speech Recognition. The MIT Press.
4. Lutz and Ascher - "Learning Python", O'Reilly.

MCA 507 P: MINOR PROJECT WORK

1. Students shall be grouped into teams not exceeding three per team for pursuing Minor Project work.
2. Each team shall identify a real-life problem pertaining to a Manufacturing / Service / Trading System and offer a solution in the form of a Computer – Based system.
3. The team should put m a combined effort of 360 student-hours (i.e, 3 students x 120 hours per student) and submit their combined report. However, the reports should reflect the contributions or individuals.
4. The students shall select appropriate:
   i. Analysis and Design Methodologies for the development of Computer Based System. Operating system platform, programming Languages/ Front-End and Back-End Tools/ Packages for implementation.

5. The team shall follow the guidelines given below while preparing their project Report:
6. The report should be given a title and it should have correlation with the contents of the report. Good quality A4 size papers shall be used of preparing the report and it shall be in the bound form. There shall be a front page depicting the Title of the Project Report, Authors Names and other information in the suggested format.
7. Minor Project Credits:
   a) Project Presentation and Project Report (2 Credits)
   b) Project Execution and Project Viva Voice (2 Credits)

MCA 508S: SEMINAR

1. Every student shall give two seminars of 30 minutes of duration each. The seminar topics should be outside the syllabus and from the emerging areas of computer Applications.
2. The student shall submit the seminar material in type written form to the teacher concerned at least two days in advance of seminar presentation date.
3. The student shall use LCD Projector for seminar presentation. He shall not use Black Board except for answering the questions after the seminar presentation, if any.

VI- SEMESTER

Major Project Work: 12 Credits

1. Project Seminar &. Project Report 4 credits
2. National / International Conference Publication Proceedings (External) : (paper based on

   project should be submitted to conference and published in the form of proceedings) 2 credits
3. National / International Journal Publication (External) (paper based on project should be

   submitted to the journal and should be published) 2 credits
4. Viva Voce (External) &. Project Execution (External) : 4 credits

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