ACADEMIC REGULATIONS
COURSE STRUCTURE AND
DETAILED SYLLABUS

COMPUTER SCIENCE & ENGINEERING

For

MCA (Master of Computer Applications)
(Three Year **Full Time** Programme)

JNTUH COLLEGE OF ENGINEERING HYDERABAD
(Autonomous)
Kukatpally, Hyderabad – 500 085, Telangana, India.

2015

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
COLLEGE OF ENGINEERING HYDERABAD
(AUTONOMOUS)
Kukatpally, Hyderabad – 500 085

ACADEMIC REGULATIONS 2015
for CBCS Based M.C.A. (Regular/Full Time) Programmes

(Effective for the students admitted into I year from the Academic Year **2015-16** and onwards)

1.0 Post-Graduate Degree Programmes in Engineering & Technology (PGP in E & T):

JNTUH offers 3 Year (6 Semesters) full-time **MCA.** Degree Programmes, under Choice Based Credit System (CBCS) at its Constituent Autonomous College - JNTUH College of Engineering Hyderabad with effect from the Academic Year 2015 - 16 onwards.

2.0 Eligibility for Admission:

Admission to the above programme shall be made subject to the eligibility and qualifications prescribed by the College/University from time to time.
Admission shall be made on the basis of the merit rank obtained by the qualifying candidate at ICET for MBA/MCA conducted by the TSCHE subject to reservations as prescribed by the Government from time to time.

3.0 M.C.A. Programme Structure:

3.1 The M.C.A. Programme in JNTUH-CEH is of Semester Pattern, with 6 Semesters constituting 3 Academic Years, each Academic Year having TWO Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 Weeks duration (inclusive of Examinations), with a minimum of 90 Instructional Days per Semester.

3.2 UGC/ AICTE specified Definitions/ Descriptions are adopted appropriately for various terms and abbreviations used in these MCA - Academic Regulations.

3.2.1 **Semester Scheme:**
Each Semester having - 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as denoted are taken as 'references' for the present set of Regulations. The terms 'SUBJECT' or 'COURSE' imply the same meaning here, and refer to 'Theory Subject', or 'Lab Course', or 'Design/ Drawing Subject', or 'Seminar', or 'Comprehensive Viva', or 'Project', as the case may be.

3.2.2 **Credit Courses:**

All Subjects (or Courses) are to be registered by a student in a Semester to earn Credits. Credits shall be assigned to each Subject/ Course in a L: T: P: C (Lecture Periods: Tutorial Periods: Practicals Periods : Credits) Structure, based on the following general pattern …

- One hour/ Week/ Semester for Theory/ Lecture (L) Courses; and,
- Two hours/ Week/ Semester for Laboratory/ Practical (P) Courses or Tutorials (T).

Other student activities like Study Tour, Guest Lecture, Conference/ Workshop Participations, Technical Paper Presentations etc., and identified Mandatory Courses if any, will not carry Credits.

3.2.3 **Subject/ Course Classification:**

All Subjects/ Courses offered for the MCA are broadly classified as : (a) Core Courses (CoC), and (b) Elective Courses (EℓC).

- Core Courses (CoC) and Elective Courses (EℓC) are categorized as PS (Professional Subjects), which are further subdivided as – (i) PC (Professional/ Departmental Core) Subjects, (ii) PE (Professional/ Departmental Electives) , (iii) Seminar, (iv), and (v) Project Work (PW).

3.2.4 **Course Nomenclature:**

The Curriculum Nomenclature or Course-Structure Grouping for the M.C.A. Degree Programmes is as listed below …

S. No.	***Broad Course Classification***	***Course Group/ Category***	***Courses Description***	***Credits***
1)	Foundation Courses (FnC)	BS – Basic Sciences	Includes - Mathematics, Physics and Chemistry Subjects	04
2)		HS – Humanities and Social Sciences	Includes subjects related to Humanities, Social Sciences and Management	10
3)	Core Courses (CoC)	PC- Professional Core	Includes core subjects related to the Parent Discipline/ Department/ Branch of Engg.	108
4)	Elective Courses (EℓC)	PE– Professional Electives	Includes Elective subjects related to the Parent Discipline/ Department/ Branch of Engg.	12
5)		OE- Open Elective	Elective subjects which include inter-siciplinary subjects or subjects in an area outside the Parent Discipline/ Department/ Branch of Engg.	04
6)	Core Courses	Project Work	M.C.A. Project	22
7)		Seminar	Seminar/ Colloquium based on core contents related to Parent Discipline/ Department/ Branch of Engg.	2
Total Credits for PGP				**162**

4.0 Course Work:

4.1 A Student, after securing admission, shall pursue and complete the M.C.A. in a minimum period of 3 Academic Years (6 Semesters), and within a maximum period of 6 Academic Years (starting from the Date of Commencement of I Year).

4.2 Each student shall Register for and Secure the specified number of Credits required for the completion and Award of the M.C.A.

4.3 I Year is structured to provide typically 28 Credits (28 C) in each of the I and II Semesters, and II Year comprises of 28 Credits (28 C), in each of the I and II Semesters, III Year comprises of 28 credits (28 C) in I-Sem and 22 credits in II Semester, totaling to 162 Credits (162 C) for the entire M.C.A. Programme.

5.0 Course Registration:

5.1 A 'Faculty Advisor' shall be assigned to M.C.A., who will advise the Students about the M.C.A. Programme, its Course Structure and Curriculum, Choice/ Option for Subjects/ Courses, based on his competence, progress, pre-requisites and interest.

5.2 A Student may be permitted to Register for Subjects/ Courses of 'his CHOICE' with a typical total of 28 Credits per Semester in the first five semesters (Minimum being 24 C and Maximum being 32 C, permitted deviation being ± 15%), 22 credits (inclusive of Project) in VI Semester in III Year (minimum being 20 C and maximum 26 C), based on his interest, competence, progress, and 'PRE-REQUISITES' as indicated for various Subjects/ Courses, in the Department Course Structure (for the relevant Specialization) and Syllabus contents for various Subjects/ Courses.

5.3 Choice for 'additional Subjects/ Courses' in any Semester (above the typical 28/22 Credit norm, and within the Maximum Permissible Limit of 32/26 Credits, as applicable) must be clearly indicated in the Registration, which needs the specific approval and signature of the Faculty Advisor/ Counselor on hard-copy.

5.4 Dropping of Subjects/ Courses in any of the first five semesters of the program may be permitted, ONLY AFTER obtaining prior approval and signature from the Faculty Advisor (subject to retaining a minimum of 24 Credits), 'within 15 Days of Time' from the beginning of the current Semester.

6.0 Attendance Requirements:

6.1 A Student shall be eligible to appear for the End Semester Examination (SEE) of any Subject, if he acquires a minimum of 75% of attendance in that Subject for that Semester.

6.2 A Student's Seminar Report and Seminar Presentation shall be eligible for evaluation, only if he ensures a minimum of 75% of his attendance in Seminar Presentation Classes during that Semester.

6.3 Condoning of shortage of attendance up to 10% (65% and above, and below 75%) in each Subject or Seminar of a Semester may be granted by the College

Academic Council on genuine and valid grounds, based on the Student's representation with supporting evidence.

6.4 A stipulated fee per Subject/Seminar shall be payable towards condoning of shortage of attendance.

6.5 Shortage of Attendance below 65% in any Subject/Seminar shall in NO case be condoned.

6.6 A Student, whose shortage of attendance is not condoned in any Subject(s) or Seminar in any Semester, is considered as 'Detained in that Subject(s)/ Seminar', and is not eligible to take End Examination(s) of such Subject(s) (and in case of Seminars, his Seminar Report or Presentation are not eligible for evaluation) in that Semester; and he has to seek Re-registration for those Subject(s)/Seminar in subsequent Semesters, and attend the same as and when offered.

7.0 Academic Requirements:

The following Academic Requirements have to be satisfied, in addition to the Attendance Requirements mentioned in Item No. 6**.**

7.1 A Student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to each Subject/ Course, if he secures not less than 40% Marks (28 out of 70 Marks) in the End Semester Examination, and a minimum of 50% of Marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of Letter Grades, this implies securing B Grade or above in that Subject.

7.2 A Student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to - Seminar, if he secures not less than 50% of the total Marks to be awarded for each. The Student would be treated as failed, if he - (i) does not present the Seminar as required, or (ii) secures less than 50% of Marks (< 50 Marks) in -Seminar.

7.3 A Student shall - register for all Subjects covering 162 Credits as specified and listed in the Course Structure for the chosen PGP Specialization, put up all the Attendance and Academic requirements for securing 162 Credits obtaining a minimum of B Grade or above in each Subject, and 'earn all 162 Credits securing SGPA $\geq$ 5.0 (in each Semester) and final CGPA (ie., CGPA at the end of PGP) $\geq$ 5.0, to successfully complete the PGP.

7.4 Students who fail to earn 162 Credits as per the specified Course Structure, and as indicated above, within 6 Academic Years from the Date of Commencement of their I Year, shall forfeit their seats in M.C.A. Programme and their admissions shall stand cancelled.

7.5 When a Student is detained due to shortage of attendance in any Subject(s)/Seminar in any Semester, no Grade Allotment will be done for such Subject(s)/Seminar, and SGPA/ CGPA calculations of that Semester will not include the performance evaluations of such Subject(s)/Seminar in which he got detained. However, he becomes eligible for re-registration of such Subject(s)/Seminar (in which he got detained) in the subsequent Semester(s), as and when next offered, with the Academic Regulations of the Batch into

which he gets readmitted, by paying the stipulated fees per Subject. In all these re-registration cases, the Student shall have to secure a fresh set of Internal Marks (CIE) and End Semester Examination Marks (SEE) for performance evaluation in such Subject(s), and subsequent SGPA/ CGPA calculations.

7.6 A Student eligible to appear in the End Semester Examination in any Subject, but absent at it or failed (failing to secure B Grade or above), may reappear for that Subject at the supplementary examination (SEE) as and when conducted. In such cases, his Internal Marks (CIE) assessed earlier for that Subject/ Course will be carried over, and added to the marks to be obtained in the supplementary examination (SEE), for evaluating his performance in that Subject.

8.0 Evaluation - Distribution and Weightage of Marks:

8.1 The performance of a Student in each Semester shall be evaluated Subject-wise (irrespective of Credits assigned) with a maximum of 100 Marks for Theory or Practicals or Seminar etc; however, the M.C.A. Project Work (Major Project) will be evaluated for 200 Marks.

8.2 a) For Theory Subjects, there shall be a Continuous Internal Evaluation (CIE) during the Semester for 30 Internal Marks, and 70 Marks are assigned for Lab./Practicals End Semester Examination (SEE), CIE Marks shall comprise of - Mid-Term Examination Marks (for 25 Marks), and Assignment Marks (for 5 Marks).

b) During the Semester, there shall be 2 Mid-Term examinations. Each Mid-Term examination shall be for 25 Marks (with 120 minutes duration). The better performance out of these two Mid-Term Examinations shall be considered for the award of 25 Marks.

8.3 For Practical Subjects, there shall be a Continuous Internal Evaluation (CIE) during the Semester for 30 Internal Marks, and 70 Marks are assigned for Lab./Practicals End Semester Examination (SEE). Out of the 30 Marks for Internals, day-to-day work assessment in the laboratory shall be evaluated for 20 Marks; and the performance in an internal Lab./Practical Test shall be evaluated for 10 marks. The SEE for Lab./ Practicals shall be conducted at the end of the Semester by the concerned Lab. Teacher and another faculty member of the same Department as assigned by the Head of the Department.

8.4 There shall be a Seminar Presentation in I Year I Semester or II Semester. For the Seminar, the Student shall collect the information on a specialized topic, prepare a Technical Report and submit to the Department at the time of Seminar Presentation. The Seminar Presentation (along with the Technical Report) shall be evaluated by Two Faculty Members assigned by Head of the Department, for 100 Marks.There are no internal marks for the seminar.

8.5 a) Every MCA Student shall be required to execute his M.C.A Project, under the guidance of the Supervisor assigned to him by the Head of Department. The MCA Project shall start immediately after the completion of

the II Year II Semester, and shall continue through III Year I and II Semesters. The Student shall carry out the literature survey, select an appropriate topic and submit a Project Proposal within 6 weeks (immediately after his I Year II Semester End Examinations), for approval by the Project Review Committee (PRC). The PRC shall be constituted by the Head of Department, and shall consist of the Head of Department, Project Supervisor, and a Senior Faculty Member of the Department. The Student shall present his Project Work Proposal to the PRC (PRC-I Presentation), on whose approval he can 'REGISTER for the PG Project'. Every Student must compulsorily register for his M.C.A. Project Work, within the 6 weeks of time-frame as specified above. After Registration, the Student shall carry out his work, and continually submit 'a fortnightly progress report' to his Supervisor throughout the Project period. The PRC will monitor the progress of the Project Work and review, through PRC-II and PRC-III Presentations – one at the end of the II Year I Semester, and one before the submission of M.Tech. Project Work Report/ Dissertation.

b) After PRC-III presentation, the PRC shall evaluate the entire performance of the Student and declare the Project Report as 'Satisfactory' or 'Unsatisfactory'. Every Project Work Report/ Dissertation (that has been declared 'satisfactory') shall undergo 'Plagiarism Check' as per the University/ College norms to ensure content plagiarism below a specified level of 30%, and to become acceptable for submission. In case of unacceptable plagiarism levels, the student shall resubmit the Project Work Report, after carrying out the necessary modifications/ additions to his Project Work/ Report as per his Supervisor's advice, within the specified time, as suggested by the PRC.

c) If any Student could not be present for PRC-II at the scheduled time (after approval and registration of his Project Work at PRC-I), his submission and presentation at the PRC-III time (or at any other PRC specified dates) may be treated as PRC-II performance evaluation, and delayed PRC-III dates for him may be considered as per PRC recommendations. Any Student is allowed to submit his M.C.A. Project Dissertation 'only after completion of 40 weeks from the date of approval/registration' of his Project, and after obtaining all approvals from the PRC.

d) A total of 200 Marks are allotted for the M.C.A Project Work, (out of which 100 Marks are allotted for internal evaluation and 100 Marks for external evaluation). For internal Evaluation of 100 marks, Project Supervisor shall evaluate for 60 marks based on the continuous Internal Evaluation(CIE) of the student's performance and combined PRC-I, II & III performance evaluation will be for 40 marks (to be awarded by PRC, as SEE).

8.6 a) The Student shall be allowed to submit his Project Dissertation, only on the successful completion of all the prescribed PG Subjects (Theory and Labs.), Seminar, (securing B Grade or above), and after obtaining all approvals from PRC. In such cases, the M.C.A. Dissertations will be sent to an External Examiner nominated by the Principal of the College, on whose 'approval', the Student can appear for the M.C.A. Project Viva-voce Examination, which shall be conducted by a Board, consisting of the PG Project Supervisor, Head of the Department, and the External Examiner who adjudicated the M.C.A. Project Work and Dissertation. The Board shall

jointly declare the Project Work Performance as 'satisfactory', or 'unsatisfactory'; and in successful cases, the External Examiner shall evaluate the Student's Project Work presentation and performance for 100 Marks (SEE).

b) If the adjudication report of the External Examiner is 'not favourable' , then the Student shall revise and resubmit his Dissertation after one Semester, or as per the time specified by the External Examiner and/ or the PRC. If the resubmitted report is again evaluated by the External Examiner as 'not favourable', then that Dissertation will be summarily rejected. Subsequent actions for such Dissertations may be considered, only on the specific recommendations of the External Examiner and/ or PRC.

c) In cases, where the Board declared the Project Work Performance as 'unsatisfactory', the Student is deemed to have failed in the Project Viva-voce Examination, and he has to reappear for the Viva-voce Examination as per the Board recommendations. If he fails in the second Viva-voce Examination also, he will not be considered eligible for the Award of the Degree, unless he is asked to revise and resubmit his Project Work by the Board within a specified time period (within 6 years from the date of commencement of his I Year I Semester).

9.0 Re-Admission / Re-Registration:

9.1 Re-Admission for Discontinued Students:

Students, who have discontinued the M.C.A. Degree Programme due to any reasons what so ever, may be considered for 'Readmission' into the same Degree Programme (with same specialization) with the Academic Regulations of the Batch into which he gets readmitted, with prior permission from the concerned authorities, subject to Item 4.1.

9.2 Re-Registration for Detained Students:

When any Student is detained in a Subject (s)/ Seminar due to shortage of attendance in any Semester, he may be permitted to re-register for the same Subject in the 'same category' (Core or Elective Group) or equivalent Subject if the same Subject is not available, as suggested by the Board of Studies of that Department, as when offered in the sub-sequent Semester(s), with the Academic Regulations of the Batch into which he seeks re-registration , with prior permission from the concerned authorities, subject to Item 4.1.

10.0 Grading Procedure:

10.1 Marks will be awarded to indicate the performance of each student in each Theory Subject, or Lab/Practicals, or Seminar, or Project, etc., based on the % marks obtained in CIE + SEE (Continuous Internal Evaluation + Semester End Examination, both taken together) as specified in Item 6 above, and a corresponding Letter Grade shall be given.

10.2 As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades (UGC Guidelines) and corresponding percentage of marks shall be followed:

% of Marks Secured (Class Intervals)	*Letter Grade (UGC Guidelines)*	*Grade Points*
80% and above (≥ 80% , ≤ 100%)	O (Outstanding)	10
Below 80% but not less than 70% (≥ 70% , < 80%)	A^+ (Excellent)	9
Below 70% but not less than 60% (≥ 60% , < 70%)	A (Very Good)	8
Below 60% but not less than 55% (≥ 55% , < 60%)	B^+ (Good)	7
Below 55% but not less than 50% (≥ 50% , < 55%)	B (above Average)	6
Below 50% (< 50%)	F (FAIL)	0
Absent	**Ab**	**0**

10.3 A student obtaining F Grade in any Subject shall be considered 'failed' and is be required to reappear as 'Supplementary Candidate' in the Semester End Examination (SEE), as and when offered. In such cases, his Internal Marks (CIE Marks) in those Subjects will remain the same as those he obtained earlier.

10.4 A Letter Grade does not imply any specific % of Marks.

10.5 A student earns Grade Point (GP) in each Subject/ Course, on the basis of the Letter Grade obtained by him in that Subject/ Course (excluding Mandatory non-credit Courses). Then the corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Subject/ Course.

Credit Points (CP) = Grade Point (GP) x Credits …. For a Course

10.6 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (ΣCP) secured from ALL Subjects/ Courses registered in a Semester, by the Total Number of Credits registered during that Semester. SGPA is rounded off to TWO Decimal Places. SGPA is thus computed as

SGPA = { $\sum_{i=1}^{N} C_i \, G_i$ } / { $\sum_{i=1}^{N} C_i$ } …. For each Semester,

where 'i' is the Subject indicator index (takes into account all Subjects in a Semester), 'N' is the no. of Subjects 'REGISTERED' for the Semester (as specifically required and listed under the Course Structure of the parent Department), C_i is the no. of Credits allotted to the i^{th} Subject, and G_i represents the Grade Points (GP) corresponding to the Letter Grade awarded for that i^{th} Subject.

10.7 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over all Semesters considered for registration. The CGPA is the ratio of the Total Credit Points secured by a student in ALL registered Courses in ALL Semesters, and the Total Number of Credits registered in ALL the Semesters. CGPA is rounded off to TWO Decimal Places. CGPA is thus computed from the I Year second Semester onwards, at the end of each Semester, as per the formula

CGPA = { $\sum_{j=1}^{M} C_j G_j$ } / { $\sum_{j=1}^{M} C_j$ } … for all S Semesters registered (ie., upto and inclusive of S Semesters, S ≥ 1),

where 'M' is the TOTAL no. of Subjects (as specifically required and listed under the Course Structure of the parent Department) the Student has 'REGISTERED' from the 1st Semester onwards upto and inclusive of the Semester S (obviously M > N), 'j' is the Subject indicator index (takes into account all Subjects from 1 to S Semesters), C_j is the no. of Credits allotted to the j^{th} Subject, and G_j represents the Grade Points (GP) corresponding to the Letter Grade awarded for that j^{th} Subject. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

10.8 For Merit Ranking or Comparison Purposes or any other listing, ONLY the 'ROUNDED OFF' values of the CGPAs will be used.

10.9 For Calculations listed in Item 10.5 – 10.8, performance in failed Subjects/ Courses (securing F Grade) will also be taken into account, and the Credits of such Subjects/ Courses will also be included in the multiplications and summations. However, Mandatory Courses will not be taken into consideration.

10.10 A student shall be declared successful or 'passed' in a Semester, only when he gets a SGPA ≥ 5.00 (at the end of that particular Semester); and a student shall be declared successful or 'passed' in the entire M.C.A, only when gets a CGPA ≥ 5.00; subject to the condition that he secures a GP ≥ 6 (B Grade or above) in every registered Subject/ Course in each Semester (during the entire M.C.A) for the Degree Award, as required.

10.11 After the completion of each Semester, a Grade Card or Grade Sheet (or Transcript) shall be issued to all the Registered Students of that Semester, indicating the Letter Grades and Credits earned. It will show the details of the Courses Registered (Course Code, Title, No. of Credits, Grade Earned etc.), Credits earned, SGPA, and CGPA.

10.12 **Passing Standards :**

10.12.1 A Student shall be declared successful or 'passed' in a Semester, only when he gets a SGPA ≥ 5.00 (at the end of that particular Semester); and a Student shall be declared successful or 'passed' in the entire PGP, only when gets a CGPA ≥ 5.00; subject to the condition that he secures a GP ≥ 6 (B Grade or above) in every registered Subject/ Course in each Semester (during the entire PGP), for the Award of the Degree, as required.

10.12.2 After the completion of each Semester, a Grade Card or Grade Sheet (or Transcript) shall be issued to all the Registered Students of that Semester, indicating the Letter Grades and Credits earned. It will show

the details of the Courses Registered (Course Code, Title, No. of Credits, Grade Earned), Credits earned, SGPA, and CGPA etc.

11.0 Declaration of Results:

11.1 Computation of SGPA and CGPA are done using the procedure listed in 10.5 – 10.8.

11.2 For Final % of Marks equivalent to the computed CGPA, the following formula may be used ..

% of Marks = (CGPA – 0.5) x 10

12.0 Award of Degree and Class:

12.1 A Student who registers for all the specified Subjects/ Courses as listed in the Course Structure, satisfies all the Course Requirements, and passes the examinations prescribed in the entire PG Programme (PGP), and secures the required number of **90** Credits (with GP ≥ 6.0), shall be declared to have 'QUALIFIED' for the award of the M.Tech. Degree in the chosen Branch of Engineering and Technology with specialization as he admitted.

12.2 **Award of Class**

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of M. Tech. Degree, he shall be placed in one of the following four classes based on the % CGPA:

Class Awarded	CGPA
First Class with Distinction	≥ 7.75
First Class	6.75 ≤ CGPA < 7.75
Second Class	6.0 ≤ CGPA < 6.75

12.3 A student with final CGPA (at the end of the PGP) < 6.00 will not be eligible for the Award of Degree.

13.0 Withholding of Results:

13.1 If a Student has not paid fees to University/ College at any stage, or has pending dues against his name due to any reason whatsoever, or if any case of indiscipline is pending against him, the result of the Student may be withheld, and he will not be allowed to go into the next higher Semester. The Award or issue of the Degree may also be withheld in such cases.

14.0 Transitory Regulations:

14.1 A Student - who has discontinued for any reason, or who has been detained for want of attendance as specified, or who has failed after having undergone M.C.A, may be considered eligible for readmission to the M.C.A with same set of Subjects/ Courses (or equivalent Subjects/ Courses as the case may be), and same Professional Electives (or from same set/category of Electives or equivalents as suggested), as and when they are offered (within the time-

frame of 6 years from the Date of Commencement of his I Year I Semester).

15.0 Student Transfers:

15.1 There shall be no Branch/ Specialization transfers after the completion of Admission Process.

15.2 There shall be no transfer among the Constituent Colleges and Units of Jawaharlal Nehru Technological University Hyderabad.

16.0 Scope:

i) Where the words "he", "him", "his", occur in the write-up of regulations, they include "she", "her", "hers".
ii) Where the words "Subject" or "Subjects", occur in these regulations, they also imply "Course" or "Courses".
iii) The Academic Regulations should be read as a whole, for the purpose of any interpretation.
iv) In case of any doubt or ambiguity in the interpretation of the above regulations, the decision of the Vice-Chancellor/ Principal is final.
v) The College may change or amend the Academic Regulations, and/ or Course Structure, and/ or Syllabi at any time, and the changes or amendments made shall be applicable to all Students with effect from the dates as notified by the University/ College.

17. MALPRACTICES RULES:

	Nature of Malpractices	Punishment
	If the candidate:	
1 (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
1 (b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall	Expulsion from the examination hall and

	from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6	Refuses to obey the orders of the Chief Superintendent / Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared

	around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the

		subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a 8police case will be registered against them.
10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester / year examinations.
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the College / University for further action to award suitable punishment.	

18. GENERAL:

- **Credit**: A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.
- **Credit Point:** It is the product of grade point and number of credits for a course.
- The Academic Regulations should be read as a whole for the purpose of any interpretation.
- The University/College reserves the right of altering the Academic Regulations and/or Syllabus/Course Structure, as and when necessary. The modifications or amendments may be applicable to all the candidates on rolls, as specified by the University/College.
- Wherever the words 'he' or 'him' or 'his' occur in the above regulations, they will also include 'she' or 'her' or 'hers'.
- Wherever the word 'Subject' occurs in the above regulations, it implies the 'Theory Subject', 'Practical Subject' or 'Lab.' and 'Seminar'.
- In case of any ambiguity or doubt in the interpretations of the above regulations, the decision of the Vice-Chancellor will be final.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

Master of Computer Applications (MCA) w.e.f 2015-16

MCA 1st Year (I-Semester)

Code	Subject	L	T	P	Credits
MC 1.1	Mathematical Foundations of Computer Science	4	-	-	4
MC 1.2	Computer Organization	4	-	-	4
MC 1.3	Computer Programming & Data Structures	4	-	-	4
MC 1.4	Probability and Statistics	4	-	-	4
MC 1.5	Accountancy and Financial Management	4	-	-	4
MC 1.6	Professional Communication Skills	4	-	-	4
MC 1.7	Professional Communication Skills Lab	-	-	4	2
MC 1.8	Computer Programming & Data Structures Lab	-	-	4	2
					28

MCA 1st Year (II-Semester)

Code	Subject	L	T	P	Credits
MC 2.1	Object Oriented Programming through Java	4	-	-	4
MC 2.2	Advanced Data Structures & Algorithms	4	-	-	4
MC 2.3	Computer Networks	4	-	-	4
MC 2.4	Operating Systems	4	-	-	4
MC 2.5	Database Management Systems	4	-	-	4
MC 2.6	Software Engineering	4	-	-	4
MC 2.7	Advanced Data Structures & Algorithms Lab	-	-	4	2
MC 2.8	Database Management Systems Lab	-	-	4	2
					28

MCA 2nd Year (III-Semester)

Code	Subject	L	T	P	Credits
MC 3.1	Network Administration	4	-	-	4
MC 3.2	Management Information Systems	4	-	-	4
MC 3.3	Computer Graphics	4	-	-	4
MC 3.4	Object Oriented Analysis and Design (using UML)	4	-	-	4
MC 3.5	Operations Research	4	-	-	4
MC 3.6	Software Testing Methodologies	4	-	-	4
MC 3.7	Network Administration Lab	-	-	4	2
MC 3.8	CASE Tools Lab	-	-	4	2
					28

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

Master of Computer Applications (MCA) w.e.f 2015-16

MCA 2nd Year (IV-Semester)

Code	Subject	L	T	P	Credits
MC 4.1	Java and Web Technologies	4	-	-	4
MC 4.2	Data Warehousing and Data Mining	4	-	-	4
MC 4.3	Android Application Development	4	-	-	4
MC 4.4	Scripting Languages	4	-	-	4
MC 4.5	Dept. Elective-I	4	-	-	4
MC 4.6	Open Elective	4	-	-	4
MC 4.7	Web Programming Lab	-	-	4	2
MC 4.8	Android Programming Lab	-	-	4	2
					28

MC 4.5 Dept. Elective-I
MC 4.5.1 Soft Computing
MC 4.5.2 Software Project Management
MC 4.5.3 Digital Forensics
MC 4.5.4 Information Security & Audit Control

MC 4.6 Open Elective
MC 4.6.1 Professional Ethics
MC 4.6.2 Intellectual Property Rights & Cyber Laws
MC 4.6.3 Ethical Hacking
MC 4.6.4 Engineering Management

MCA 3rd Year (V-Semester)

Code	Subject	L	T	P	Credits
MC 5.1	Mobile Commerce	4	-	-	4
MC 5.2	Information Security	4	-	-	4
MC 5.3	Big Data Analytics	4	-	-	4
MC 5.4	Cloud Computing	4	-	-	4
MC 5.5	Dept. Elective-II	4	-	-	4
MC 5.6	Dept. Elective-III	4	-	-	4
MC 5.7	Information Security Lab	-	-	4	2
MC 5.8	Project Stage I	-	-	4	2
					28

MC 5.5 Dept. Elective-II
MC 5.5.1 Distributed Systems
MC 5.5.2 Machine Learning
MC 5.5.3 Business Intelligence
MC 5.5.4 Real Time Operating Systems

MC 5.6 Dept. Elective-III
MC 5.6.1 Distributed Databases
MC 5.6.2 Web Services & Service Oriented Architecture
MC 5.6.3 Simulation & Modeling
MC 5.6.4. Information Retrieval Systems

MCA 3rd Year (VI-Semester)

Code	Subject	L	T	P	Credits
MC 6.1	Technical Seminar (External Evaluation)	-	-	-	2
MC 6.2	Project Stage II	-	-	-	20
					22

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **I Semester**

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Prerequisites
- An understanding of Math in general is sufficient.

Objectives
- Introduces the elementary discrete mathematics for computer science and engineering.
- Topics include formal logic notation, methods of proof, induction, sets, relations, algebraic structures, elementary graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

Outcomes
- Ability to understand and construct precise mathematical proofs
- Ability to use logic and set theory to formulate precise statements
- Ability to analyze and solve counting problems on finite and discrete structures
- Ability to describe and manipulate sequences
- Ability to apply graph theory in solving computing problems

UNIT I
Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, Tautology, equivalence implication, Normal forms.
Predicates: Predicate logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT II
Set Theory: Introduction, Properties of binary Relations, Closure, Warshall's Algorithm, Equivalence and Partitions, Compatibility and partial ordering relations, Hasse diagram.
Functions: Invertible Function, Composition of functions, recursive Functions, Hashing, Lattice and its Properties, Sequences and Summations.

UNIT III
Algebraic structures: Algebraic systems Examples and general properties, Groups, Semi groups, Subgroups and monoids, groups sub groups' homomorphism, Isomorphism, Rings, Integral domains and Fields, Ring Homomorphism's and Polynomial Rings.

UNIT IV
Combinatorics: Counting, Combinations and Permutations, Enumerating of Combinations and Permutations, with repetitions, with constrained repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion-Exclusion.
Recurrence Relations: Concepts of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, the Method of Characteristics Roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT V

Graphs: Graph Terminology and Special Types of Graphs , Representing Graphs and Graph Isomorphism , Connectivity , Euler and Hamilton Paths , Shortest-Path Problems , Planar Graphs , Graph Coloring

Trees and Cut-Sets: Trees, Rooted Trees, Path Lengths in Rooted Trees, Prefix Codes, Binary Search Trees, Spanning Trees and Cut-Sets, Tie-Sets, Minimum Spanning Trees, Transport Networks.

TEXT BOOKS:

1. L LIU and DP Mohapatra - Elements of Discrete Mathematics – Tata McGraw Hill Publishing Co.
2. Kenneth H Rosen - Discrete Mathematics and Its Applications – Tata McGraw Hill Publishing Co.
3. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker Prentice Hall.

REFERENCE BOOKS:

1. Discrete and Combinational Mathematics- An Applied Introduction-5th Edition – Ralph. P. Grimaldi - Pearson Education.
2. Discrete Mathematical Structures – Thomas Koshy - Tata McGraw Hill Publishing Co.
3. Tremblay JP & Manohar P - Discrete Mathematical Structures with applications to computer science - Tata McGraw Hill Publishing Co.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **I Semester**

COMPUTER ORGANIZATION

Prerequisites

No prerequisites

Objectives

1. The purpose of the course is to introduce principles of computer organization, design of digital logic circuits and the basic architectural concepts.
2. It begins with digital components, digital logic circuit design, basic organization, and introduces simple register transfer language to specify various computer operations.
3. Topics include computer arithmetic, instruction set design, micro programmed control unit, pipelining, memory organization and I/O systems, and multiprocessors

Outcomes

1. Understand the basics of instructions sets and their impact on processor design.
2. Demonstrate an understanding of the design of the functional units of a digital computer system.
3. Design a pipeline for consistent execution of instructions with minimum hazards.
4. Recognize and manipulate representations of numbers stored in digital computers

UNIT-I

Digital Logic Circuits: Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip-Flops, Sequential Circuits.

Digital Components: Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit

Data Representation: Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Other Binary Codes, Error Detection Codes

UNIT-II

Register Transfer Language and Micro operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic Logic Shift Unit

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator Logic

UNIT III

Micro Programmed Control: Control Memory, Address sequencing, Micro Program Example, Design of Control Unit.

Central Processing Unit: Introduction, General Register Organization, STACK organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

UNIT IV

Pipelining: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline

Computer Arithmetic: Introduction, Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – Point Arithmetic operations, Decimal Arithmetic unit, Decimal Arithmetic Operations

UNIT V

Input-Output Organization: Peripheral Devices, Input-Output Interface, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP)

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

TEXT BOOKS:

1. Morris Mano -Computer System Architecture –3rd Edition-Pearson Education.

REFERENCE BOOKS:

1. Computer Organization – Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 5th Edition, McGraw Hill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **I Semester**

COMPUTER PROGRAMMING & DATA STRUCTURES

Prerequisites

- No prerequisites
- Requires analytical skills and logical reasoning.

Objectives

- This course starts from the basics of computers and program development.
- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Outcomes

- Ability to develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings; and data structures like stacks, queues and linked lists.
- Ability to implement searching and sorting algorithms

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

Introduction to C Language – Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associatively, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

UNIT – II

Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Simple C Programming examples.

Designing Structured Programs- Functions, basics, user defined functions, inter function communication, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programs

UNIT – III

Arrays and Strings – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples. Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.

UNIT - IV

Derived types – Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types, C programming examples.

Input and Output – Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C program examples.

UNIT – V

Sorting and Searching selection sort, bubble sort, insertion sort, linear and binary search methods.

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

TEXT BOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCES:

1. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
2. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **I Semester**

PROBABILITY AND STATISTICS

Prerequisites

- --- NIL ---

Objectives

- To learn concepts of Probabilty, Estimation and Testing..

Outcomes

- Understand Probability theory
- Get the skill to apply the probability theory and distributions to solve the real time problems.
- To set the skills of application of various types of statistical testing techniques

UNIT I

Probability: Sample space and events – Probability – The axioms of probability - Some elementary theorems - Conditional probability – Baye's theorem.
Random variables – Discrete and continuous – Distribution – Distribution function.
Distribution - Binomial, poisson and normal distribution – related properties.

UNIT II

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

UNIT III

Estimation: Point estimation – interval estimation - Bayesian estimation.
Test of Hypothesis – Means and proportions – Hypothesis concerning one and two means – Type I and Type II errors. One tail, two-tail tests.

UNIT IV

Tests of significance – Student's t-test, F-test, χ^2 test. Estimation of proportions.

UNIT V:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **I Semester**

ACCOUNTANCY AND FINANCIAL MANAGEMENT

Prerequisites

- No prerequisites

Objectives

- To learn Financial Management and Accounting
- To learn different types of costing

Outcomes

- Able to prepare balance sheets of budget.
- Get the skill to manage finances of a firm/company

UNIT I

Introduction to Accounting: Principles, concepts, conventions, double entry system of accounting, introduction of basic books of accounts ledgers.
Preparation of trial balance: Final accounts - company final accounts.

UNIT II

Financial Management - meaning and scope, role, objectives of time value of money - over vitalization - under capitalization - profit maximization - wealth maximization - EPS maximization.
Ratio Analysis - advantages - limitations - Fund flow analysis - meaning, importance, preparation and interpretation of Funds flow and cash flow statements-statement.

UNIT III

Costing: nature and importance and basic principles. Absorption costing vs. marginal costing - Financial accounting vs. cost accounting vs. management accounting.
Marginal costing and Break-even Analysis: nature, scope and importance - practical applications of marginal costing, limitations and importance of cost - volume, profit analysis.

UNIT IV

Standard costing and budgeting: nature, scope and computation and analysis - materials variance, labor variance and sales variance - budgeting - cash budget, sales budget - flexible Budgets, master budgets.

UNIT V

Introduction to computerized accounting system: coding logic and codes, master files, transaction files, introduction documents used for data collection, processing of different files and Outputs obtained.

TEXT BOOKS:

1. Van Horne, James, C: Financial Management and Policy. Pearson Education, 12th Edition.
2. Financial Accounting, S.N.Maheshwari, Sultan Chand Company.
3. Financial Management, S.N.Maheshwari, Sultan Chand Company

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **I Semester**

PROFESSIONAL COMMUNICATION SKILLS

Prerequisite: ---- NIL ----

Objectives:

- To learn the four language skills - Listening, Speaking, Reading and Writing; critical thinking skills to students.
- To enable students comprehend the concept of communication.
- To help students cultivate the habit of Reading and develop their critical reading skills.

Outcomes:

- Ability to convert the conceptual understanding of communication into every day practice.
- Ability to communicate their ideas relevantly and coherently in professional writing.

UNIT I
INTRODUCTION
Basics of Communication - Principles of Communication - Types of Communication – Stages of Communication – Verbal and Non-verbal Communication – Channels of Communication – Barriers to Effective Communication – Formal and Informal Expressions in Various Situations.

UNIT II
READING & STUDY SKILLS
Reading Comprehension – Reading Strategies - Skimming and Scanning- Intensive and Extensive Reading– Unknown Passage for Comprehension - Critical Reading of Short Stories – Study Skills – Note Making – Summarizing – Articles and Prepositions – Synonyms and Antonyms

UNIT III
WRITING SKILLS
Difference between Spoken and Written Communication- Features of Effective Writing - Formation of a Sentence – SVOs and SVOC patterns – Types of sentences- Common errors in Writing - Writing coherent sentences using connectives and conjunctions- Written Presentation Skills – Tenses – Concord – Question Tags - Practice Exercises - One Word Substitutes – Words Often Confused and Misspelt.

UNIT IV
PROFESSIONAL WRITING
Letter writing – Types, Parts and Styles of Formal Letters – Language to be used in Formal Letters – Letters of Enquiry, Complaint, and Apology with Replies – Letter of Application - Resume – E-mail – Active and Passive Voice.

UNIT V
REPORT WRITING
Types of Reports – Formats of Reports – Memo Format – Letter Format and Manuscript Format- Parts of Technical Report – Informational, Analytical and Project Reports – Idioms and Phrases.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeetha Sharma. 2012. *Technical Communication.* New Delhi: OUP
2. Rizvi, M. A. 2005. *Effective Technical Communication.* New Delhi: Tata McGraw Hill
3. Sanjay Kumar & Pushp Latha. 2012. *Communication Skills.* New Delhi: OUP
4. Er. A. K. Jain, Dr. Pravin S. R. Bhatia & Dr. A. M. Sheikh. 2013. *Professional Communication Skills*. S. Chand Publishers. New Delhi.
5. Farhathullah, T.M. 2009. *English for Business Communication.* Bangalore: Prism Publishers
6. Bikram K Das. 2011. Functional Grammar and Spoken and Written Communication in English. Kolkata: Orient Blackswan
7. Kiranmai Dutt, P *et al. 2011. A Course in Communication Skills. New Delhi: CUP India*
8. Krishnaswamy, N. 2000. *Modern English – A Book of Grammar, Vocabulary and Usage.* Macmillan India Pvt. Ltd
9. Ramachandran, K K. *et al.* 2007. *Business Communication.* New Delhi: Macmillan
10. Taylor, Ken. 2011. *50 ways to improve your Business English*. Hyderabad: Orient Blackswan

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **I Semester**

PROFESSIONAL COMMUNICATION SKILLS (PCS) LAB

Prerequisite: ----NIL---

Objectives

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

Outcomes

- Better Understanding of nuances of language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking with clarity and confidence thereby enhancing employability skills of the students

Syllabus: English Language Communication Skills Lab shall have two parts:

a. **Computer Assisted Language Learning (CALL) Lab**
b. **Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the **English Language Communication Skills Lab**

Exercise – I
CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants
ICS Lab: Ice-Breaking activity and JAM session
Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise – II
CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.
ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.
Concord (Subject in agreement with verb) and Words often misspelt- confused/misused

Exercise - III
CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.
ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.
Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV
CALL Lab: Intonation and Common errors in Pronunciation.
ICS Lab: Extempore- Public Speaking
Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise – V
CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice
ICS Lab: Information Transfer- Oral Presentation Skills
Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):
Computer network with Lan with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB
ii) Headphones of High quality

2. **Interactive Communication Skills (ICS) Lab :**

   The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Suggested Software:

- **Cambridge Advanced Learners' English Dictionary with CD.**
- **Grammar Made Easy by Darling Kindersley**
- **Punctuation Made Easy by Darling Kindersley**
- Clarity Pronunciation Power – Part I
- Clarity Pronunciation Power – part II
- **Oxford Advanced Learner's Compass, 8th Edition**
- ***DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.***
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge**
- **English Pronunciation in Use** (Elementary, Intermediate, Advanced) Cambridge University Press
- Raman, M & Sharma, S. 2011. Technical Communication, OUP
- Sanjay Kumar & Pushp Lata. 2011. Communication Skills, OUP

SUGGESTED READING:

1. Rama Krishna Rao, A. *et al. English Language Communication Skills – A Reader cum Lab Manual Course Content and Practice.* Chennai: Anuradha Publishers
2. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories.* New Delhi: Foundation
3. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
4. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews.* Tata McGraw Hill
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. *English Pronunciation in Use. (Elementary, Intermediate & Advance).* Cambridge: CUP
7. Chris Redston, Gillie Cunningham, Jan Bell. *Face to Face* (2nd Edition). Cambridge University Press
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication.* New Delhi : Foundation
9. Soundararaj, Francis. 2012. *Basics of Communication in English. New Delhi: Macmillan*
10. A textbook of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 30 sessional marks and 70 semester-end Examination marks. Of the 30 marks, 20 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **I Semester**

COMPUTER PROGRAMMING & DATA STRUCTURES LAB

Prerequisites

- No prerequisites
- 2. Requires analytical skills and logical reasoning.

Objectives

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Outcomes

- Develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Implement searching and sorting algorithms

Week 1:

1. Write a C program to find the sum of individual digits of a positive integer.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1.
   Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to find the roots of a quadratic equation.

Week 2:

5. Write a C program to find the factorial of a given integer.
6. Write a C program to find the GCD (greatest common divisor) of two given integers.
7. Write a C program to solve Towers of Hanoi problem.
8. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Week 3:

9. Write a C program to find both the largest and smallest number in a list of integers.
10. Write a C program that uses functions to perform the following:
    i) Addition of Two Matrices
    ii) Multiplication of Two Matrices

Week 4:

11. Write a C program that uses functions to perform the following operations:
    i) To insert a sub-string in to a given main string from a given position.
    ii) To delete n Characters from a given position in a given string.
12. Write a C program to determine if the given string is a palindrome or not

13. Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
14. Write a C program to count the lines, words and characters in a given text.

Week 5:

15. Write a C program to generate Pascal's triangle.
16. Write a C program to construct a pyramid of numbers.
17. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
    $1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$
    For example: if n is 3 and x is 5, then the program computes 1+5+25+125.
    Print x, n, the sum
    Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Week 6:

18. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
19. Write a C program to convert a Roman numeral to its decimal equivalent.

Week 7:

20. Write a C program that uses functions to perform the following operations:
    i) Reading a complex number
    ii) Writing a complex number
    iii) Addition of two complex numbers
    iv) Multiplication of two complex numbers
    (Note: represent complex number using a structure.)

Week 8:

21. i) Write a C program which copies one file to another.
    ii) Write a C program to reverse the first n characters in a file.
    (Note: The file name and n are specified on the command line.)
22. i) Write a C program to display the contents of a file.
    ii) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Week 9:

23. Write a C program that uses functions to perform the following operations on singly linked list.:
    i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 10:

24. Write C programs that implement stack (its operations) using
    i) Arrays ii) Pointers
25. Write C programs that implement Queue (its operations) using
    i) Arrays ii) Pointers

Week 11:

26. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
    i) Bubble sort ii) Selection sort

Week 12:

27. Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
    i) Linear search ii) Binary search

TEXT BOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCES:

1. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
2. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **II Semester**

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Prerequisites

- A course on "Computer Programming & Data Structures"

Objectives

- Introduces object oriented programming concepts using the Java language.
- Introduces the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes
- Introduces the implementation of packages and interfaces
- Introduces exception handling, event handling and multithreading
- Introduces the design of Graphical User Interface using applets and swings

Outcomes

- Develop applications for a range of problems using object-oriented programming techniques
- Design simple Graphical User Interface applications

UNIT I :

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT II :

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class.

Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

Exploring java.io.

UNIT III

Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

String handling,Exploring java.util.Differences between multi threading and multitasking, thread life cycle,creating threads, thread priorities, synchronizing threads, interthread communication, thread groups,daemon threads.

Enumerations, autoboxing, annotations, generics.

UNIT IV :

Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT V :

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:

1. Java the complete reference, 7th editon, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Eduction.

REFERENCES:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **II Semester**

ADVANCED DATA STRUCTURES & ALGORITHMS

Prerequisites

- A course on "Computer Programming & Data Structures"

Objectives

- Introduces the notations for analysis of the performance of algorithms
- Introduces a variety of data structures such as hash tables, disjoint sets and Priority Queue
- Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming and greedy) and mention problems for which each technique is appropriate;
- Introduces sorting, searching and pattern matching algorithms

Outcomes

- Ability to analyze the performance of algorithms
- Ability to select the data structures that efficiently model the information in a problem
- Ability to choose appropriate data structures and algorithm design methods for a specified application
- Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs
- Design programs using a variety of data structures, including hash tables, disjoint sets, trees and graphs
- Implement and know the application of algorithms for sorting and pattern matching

Unit-I

Introduction: Algorithm, Psuedo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notations, Substitution method, Master's theorem

Divide and conquer: General method , applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication

Unit-II

Disjoint Sets: Disjoint set operations, union and find algorithms

Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

Priority Queues – Definition, Realizing a Priority Queue using Heaps, operations of priority queue

Unit –III

Dynamic Programming: General method, applications- Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

Backtracking: General method, applications-n-queens problem, sum of subsets problem, graph coloring.

Unit – IV

Review of basic data structures: The list, Stack, Queue
linear list representation, skip list representation, operations - insertion, deletion and searching.

Hash table representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing, comparison of hashing and skip lists.

Searching: Linear Search and Binary Search

Sortings: Bubble sort, Selection sort, Insertion sort, Radix sort, Heap sort

Unit – V

Trees: Definition, Types of trees, Binary Trees, Binary Tree Traversal Methods, Binary search tree operations, operations of AVL tree, B-Tree, Red-Black tree, Splay tree

Graphs: Definition, Representation of graphs, Graphs Traversal Methods.

String Matching algorithms: Brute Force algorithm, Boyer Moore algorithm, Knuth- Morris-Pratt algorithm

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.
2. Fundamentals of Data Structures, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.

REFERENCES :

1. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein,PHI Pvt. Ltd./ Pearson Education.
2. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
3. Data structures: A Pseudocode Approach with C, 2 nd edition, R.F.Gilberg and B.A.Forouzan, Cengage Learning.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **II Semester**

COMPUTER NETWORKS

Prerequisites

- A course on "Computer Programming and Data Structures"

Objectives

- To introduce equip the students with a general overview of the concepts and fundamentals of computer networks.
- Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.

Outcomes

- Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
- Obtain the skills of subnetting and routing mechanisms.
- Understanding the essential protocols of computer networks, and how they can be applied in network design and implementation.

UNIT-I

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.
Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT-II

Data link layer: Design issues, framing, Error detection and correction.
Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel.
Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols.
Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT-III

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

UNIT –IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT –V

Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOK:

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S.Keshav,2nd Edition,Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **II Semester**

OPERATING SYSTEMS

Prerequisites
- A course on "Computer Programming and Data Structures"
- A course on "Computer Organization and Architecture"

Objectives
- Provide an introduction to operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

Outcomes
- Will be able to control access to a computer and the files that may be shared
- Demonstrate the knowledge of the components of computer and their respective roles in computing.
- Ability to recognize and resolve user problems with standard operating environments.
- Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

UNIT I:
Operating System Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls, Virtual Machines, System Design and Implementation.
UNIX/LINUX Utilities - Introduction to Unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, text processing utilities and backup utilities.

UNIT II:
Process and CPU Scheduling - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling, Real-Time Scheduling.
System call interface for process management-fork, exit, wait, waitpid, exec
Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

UNIT – III:
Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors.

Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory, semaphores.

UNIT IV

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Performance of Demanding Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing.

UNIT V:

File System Interface and Implementation -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management, Directory Management, Directory Implementation, Efficiency and Performance.

Unix/LINUX Files: File structure, directories, files and devices, System calls, library functions, low level file access, usage of open, create, read, write, close, lseek, stat, ioctl.

TEXT BOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI
2. Operating System A Design Approach-Crowley,TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, Pearson/PHI
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. Unix Internals The New Frontiers, U.Vahalia, Pearson Education.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **II Semester**

DATABASE MANAGEMENT SYSTEMS

Prerequisites

- A course on "Advanced Data Structures"

Objectives

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include datamodels, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Outcomes

- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Gain knowledge of fundamentals of relational algebra and relational model
- Master the basics of SQL for retrieval and management of data.
- Understand the basics of transaction processing and concurrency control.
- Familiarity with database storage structures and access techniques

UNIT I:

Database System Applications: database system Vs. file system, view of data, data abstraction, instances and schemas, data models, the ER model, relational model, other models, database languages, DDL, DML, database access for application programs, database users and administrator, transaction management, database system structure, storage manager, the query processor, history of data base systems, data base design and ER diagrams, beyond ER design entities, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept design with the ER Model, conceptual design for large enterprises.

UNIT II:

Introduction to the Relational Model: integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views, form of basic SQL query, examples of basic SQL queries, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity's, AND, OR and NOT, impact on SQL constructs, outer joins, disallowing NULL values, complex integrity constraints in SQL, triggers and active data bases, Oracle, SQL Server, DB2.

UNIT III:

Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus, Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.

Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, schema refinement in database design, multi valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT IV:

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity.

Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with loss of nonvolatile storage, Advance Recovery systems, Remote Backup systems.

UNIT V:

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

Text Books:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

References:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **II Semester**

SOFTWARE ENGINEERING

Prerequisites

- A course on "Computer Programming and Data Structures"

Objectives

- To provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.

Outcomes

- Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

UNIT-I:

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT-II:

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System models: Context models, behavioral models, data models, object models, structured methods.

UNIT-III:

Design Engineering: Design process and design quality, design concepts, the design model.

Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT-IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT-V:

Metrics for Process and Products: Software measurement, metrics for software quality.

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

Text Books:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc GrawHill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

References:

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object oriented design using UML Meiler page-Jones: Pearson Eductaion.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **II Semester**

ADVANCED DATA STRUCTURES & ALGORITHMS LAB

Prerequisites

- A course on "Computer Programming & Data Structures" and " Advanced Data Base Engineering".

Objectives

- To get practical exposure on Advanced Data Structures like AVL Trees, Red-Black treesetc.,
- implementation of data structures such as trees and graphs,
- Programming of sorting and pattern matching algorithms

Outcomes

- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations
- or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using tree structures, including Optimal binary search tree, All pairs shortest path problem, AVL tree, Red-Black trees.

1. Write a program to implement the following sorting techniques
    a. Merge sort
    b. Quick sort
    c. Bubble sort
    d. Selection sort
    e. Insertion sort
    f. Radix sort
    g. Heap sort
2. Write a program to implement the single source shortest path problem
3. Write a program to implement the Optimal binary search tree
4. Write a program to implement the All pairs shortest path problem
5. Write a program to implement the n-queens problem
6. Write a program to implement the following searching techniques
    a. Linear Search
    b. Binary Search
7. Write a program to implement the operations of Binary search tree
8. Write a program to implement the tree traversal methods
9. Write a program to implement the graph traversal methods
10. Write a program to implement the operations of AVL tree
11. Write a program to implement the operations of Red-Black tree
12. Write a program to implement the following Pattern matching algorithms
    a. Brute Force algorithm
    b. Boyer Moore algorithm
    c. Knuth- Morris-Pratt algorithm

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year MCA **II Semester**

DATABASE MANAGEMENT SYSTEMS LAB

Pre-requisites

1. Co-requisite of course “Database Management Systems”, “SQL”

Objectives

1. Introduce ER data model, database design and normalization
2. Learn SQL basics for data definition and data manipulation

Outcomes

1. Design database schema for a given application and apply normalization
2. Acquire skills in using SQL commands for retrieval and management of data.
3. Develop solutions for database applications using procedures, cursors and triggers

List of Experiments:-

1) Concept design with E-R Model
2) Relational Model
3) Normalization
4) Practicing DDL commands
5) Practicing DML commands
6) Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7) Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8) Triggers (Creation of insert trigger, delete trigger, update trigger)
9) Procedures
10) Usage of Cursors

Text Books:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

References:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year MCA **III Semester**

NETWORK ADMINISTRATION

Prerequisites:
- Computer Networks

Objectives:
- To train the students in network implementation, administration and support

Outcomes:
- Students achieve requisite skills in system and network maintenance and management

UNIT 1:
OS Overview:
Operating System Objectives and Functions, The Evolution of Operating Systems, Developments Leading to Modern Operating Systems, Virtual Machines, OS Design Considerations for Multiprocessor and Multicore architectures, Microsoft Windows Overview, Modern UNIX Systems, Linux, Android. Booting Process of all the above operating systems.

UNIT 2:
UNIX Basics:
Introduction to UNIX files system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, network commands, text processing utilities and backup utilities. Working with shell, shell script examples.

UNIT 3:
Network services and protocols - I
Domain Naming Service, Dynamic Host Configuration Protocol. Active Directory, Installation of appropriate services in Windows and Linux

UNIT 4:
Network services and protocols -II
Understanding of HTTP, FTP, NFS, Telnet, Proxy server, SAMBA server. Installation in Linux environment

UNIT 5:
Network services and protocols -III
Email service. Email server configuration in linux. Proxy web services (IIS), Windows Deployment Service (WDS), Print services installation in windows environment.

Text Books:
1. Operating systems Internals and Design Principles, 8th edition, William Stallings, Pearson.
2. Unix the ultimate guide, sumithabha Das, TMH
3. Microsoft® Windows Server® 2008 Administration, STEVE SEGUIS, Mc Graw Hill.
4. Red Hat Enterprise Linux 6 Administration, Sander van Vugt, John wiley &sons.

References:
1. The Complete Reference Linux, Richard Petersen, Mc Graw Hill.
2. Maurice J. Bach, “Design of UNIX Operating System”, PHI.
3. Linux system Administration, Tom Adelstein & Bill Lubanovic, Oreilly.

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II Year MCA **III Semester**

MANAGEMENT INFORMATION SYSTEM

Prerequisites

- ----NIL----

Objectives

- To introduce Information Systems Models
- Topics include Types of Information Systems, ERP Modules etc.,

Outcomes

- To understand different Types of Information Systems
- To gain good knowledge of ERP Modules and ERP Implementation and Maintenance.

UNIT I

Introduction to IS Models – Nolan Stage Hypothesis, IS Strategic Grid, Wards Model, Earl's Multiple Methodology, Critical Success Factors, Soft Systems Methodology, Socio-Technical Systems Approach (Mumford), System Develop Life Cycle, Prototype and End User Computing, Application Packages, Outsourcing, Deciding Combination of Methods.

UNIT II

Types of Information Systems– Transactions Processing System, Knowledge Work Systems, Office Automation System, Management Information System, Decision Support System, Expert System, Strategic Information System. IS Security, Control and Audit - System Vulnerability and Abuse, business value of security and control, Need for Security, Methods of minimizing risks, IS Audit, ensuring system quality.

UNIT III

Induction to ERP**:** Overview of ERP, MRP, MRPII and Evolution of ERP, Integrated Management Systems, Reasons for the growth of ERP, Business Modeling, Integrated Data Model, Foundations of IS in Business, Obstacles of applying IT. Advantages and limitations of ERP.

UNIT IV

ERP Modules: Finance, Accounting Systems, Manufacturing and Production Systems, Sales and Distribution Systems, , Human Resource Systems, Plant Maintenance System, Materials Management System, Quality Management System, ERP System Options and Selection, ERP proposal Evaluation.

UNIT V

ERP Implementation and Maintenance: Implementation Strategy Options, Features of Successful ERP Implementation, Strategies to Attain Success, User Training, Maintaining ERP & IS**.** Case Studies.

TEXT BOOKS:

1. Information systems for modern management, 3rd Edition by R.G Murdick, J.E Ross And J. R clagget, PHI-1994.

REFERENCE BOOKS:

1. C Laudon and Jane P.Laudon, et al: Management Information Systems, Pearson Education, 2009.
2. Alexis Leon, ERP (Demystified), 5/E, Tata McGraw-Hill, 2009.
3. David L Olson, Managerial Issues of Enterprise Resource Planning Systems, McGraw Hill, International Edition-2009.
4. Vaman, ERP in Practice, Tata McGraw-Hill , 2009
5. Gordon B. Davis & Margrethe H.Olson: Management Information Systems, Tata McGraw-Hill , 2009.
6. W S Jawadekar: Management Information Systems, Tata McGraw-Hill , New Delhi, 2009
7. James A. Obrein: Management Information Systems, Tata McGraw-Hill , 2008
8. Gerald V.Post, David L Anderson: Management Information Systems, Irvin McGraw Hill, 2009.

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II Year MCA **III Semester**

COMPUTER GRAPHICS

Prerequisites

- Familiarity with the theory and use of coordinate geometry and linear algebra, and matrix multiplications.
- A course on "Computer Programming and Data Structures"

Objectives

- The aim of this course is to provide an introduction of fundamental concepts and theory of computer graphics.
- Topics covered include graphics systems and input devices; geometric representations and 2D/3D transformations; viewing and projections; illumination and color models; animation; rendering and implementation; visible surface detection;

Outcomes

- Be able to understand graphics input and output devices.
- Be able to design basic graphics application programs, including animation
- Be able to design applications that display 2-D amd 3-D graphic images to given specifications

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 (Bresenham's and DDA Algorithm), 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, Polygon Filling

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:

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

Text Books:

1. "Computer Graphics *C version*", Donald Hearn and M.Pauline Baker, Pearson Education
2. "Computer Graphics Principles & Practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

References:

1. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
4. Computer Graphics, Steven Harrington, TMH

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
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II Year MCA **III Semester**

OBJECT ORIENTED ANALYSIS AND DESIGN (USING UML)

Prerequisites
- Software Engineering

Objectives
- To train students on object modeling
- To apply unified process phases
- To apply unified modeling language for software design of any applications
- To study case studies for OOAD

Outcomes
- Will be able to use UML notations
- Ability to apply unified process in software development
- Ability to perform analysis and design using object modeling

UNIT I
Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT II
Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT III
Basic Behavioral Modeling-I: Interactions, Interaction diagrams.
Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT IV
Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.
Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT V
Patterns and Frameworks, Artifact Diagrams.Case Study: The Unified Library application

TEXT BOOKS:
1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education 2nd Edition
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML,TMH.
5. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
7. UML and C++,R.C.Lee, and W.M.Tepfenhart,PHI.
8. Object Oriented Analysis,Design and Implementation, B.Dathan, S.Ramnath, Universities Press.
9. OODesign with UML and Java,K.Barclay,J.Savage,Elsevier.
10. Learning UML 2.0,Russ Miles and Kim Hamilton,O'Reilly,SPD.

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II Year MCA **III Semester**

OPERATIONS RESEARCH

Prerequisites

- A course on "Mathematics"

Objectives

- To introduce Linear Programming , dynamic programming Operation Research Technique.
- To understand Theory of games.

Outcomes

- Gain the knowledge of Operation Research Techniques
- Get the skill to apply Operation Research Techniques to address the real time problems .

UNIT I

DEVELOPMENT DEFINITION: Characteristics and phases scientific Method, Types of models, General methods for solving. Operations Research models.

ALLOCATION: Introduction, Linear programming Formulation, Graphical solution, Simplex method, artificial variable technique, Duality principle.

TRANSPORTATION PROBLEM: Formulation, optimal solution, un-balanced transportation problem, Degeneracy. Assignment problem: formulation optimal solution, variations. 1.a non-square (mxn) Matrix, Restrictions.

UNIT II

EEQUE CEING: Introduction, optimal solution for processing each of n-jobs through three machines, travelling salesman problem i.e., shortest acyclic route models.

REPLACEMENT: Introduction, replacement of items that deteriorate when money value is not counted and counted, replacement items that fail completely i.e., group replacements.

UNIT III

WAITING LINES: Introduction, single channel, poisson arrivals, exponential service times, unrestricted queue, with infinite population and finite population models, single channel, poisson arrivals, exponential service times with infinite population and restricted queue, multi channel, poisson arrivals, exponential service times with infinite population and unrestricted queue.

UNIT IV

INVENTORY: Introduction, single item deterministic models, production is instantaneous or at a constant rate, shortages are allowed or not allowed and withdrawals from stock is continuous, purchase inventory model with one price break, shortages are not allowed, Instantaneous production demand, production or purchase cost is relevant, stochastic models, demand may be discrete or variable or instantaneous production, instantaneous demand and no setup cost.

UNIT V

THEORY OF GAMES: Introduction, Minimax (maximum) criterion and optimal strategy, solution of games with saddle points, rectangular games without saddle points.

DYNAMIC PROGRAMMING: Introduction, Billman's Principal of optimality, solution of problems with finite number of stages.

TEXT BOOKS:

1. S.D.SHARMA : Operations Research
kedar Nath Ramnath,1972
2. P.K.GUPTA & D.S.HIRA : Operations Research
3. R.D.ASRHEDKAR & R.V.KULKARNI : Operations Research.

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II Year MCA **III Semester**

SOFTWARE TESTING METHODOLOGIES

Prerequisites

1. A course on "Software Engineering"

Objectives

1. To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
2. To develop skills in software test automation and management using latest tools.

Outcomes

1. Design and develop the best test strategies in accordance to the development model.

UNIT-I:

Introduction:- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-II:

Transaction Flow Testing:-transaction flows, transaction flow testing techniques.

Dataflow testing:- Basics of data flow testing, strategies in data flow testing, application of dataflow testing.

Domain Testing:-domains and paths, nice & ugly domains, domain testing, domains and interfaces' testing, domain and interface testing, domains and testability.

UNIT-III:

Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

UNIT-IV:

State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips.

UNIT-V:

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

Text Books:

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

References:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

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II Year MCA **III Semester**

NETWORK ADMINISTRATION LAB

Prerequisites:
- Computer Networks

Objective:
- Practical exposure to students in network installation, administration and maintenance

Outcomes:
- Student understands Linux commands for configuring system
- Student acquires requisite skills in network installation, administration maintenance

1. Working with shell commands related to file permissions, processes, networking and backup.
2. Write a shell script to generate a multiplication table
3. Write a shell script that copies multiple files to a directory
4. Write a shell script which counts the number of lines and words present in a given file
5. Write a shell script that displays the list of files in the given directory
6. Write a shell script that adds, subtracts, multiplies and divides the given two numbers. There are two division options: one returns the quotient and the other returns reminder. The script requires 3 arguments: The opeation to be used and two integer numbers. The options are add(-a), subtract (-s), multiply (-m) and reminder (-r).
7. Write a shell script to reverse the rows and columns of a matrix

System and network experiments:

1. Demonstration of server construction
2. Create the "LVM" with the name "development" by using 21PE's from the volume group "engineering". Consider the PE size as "8MB". Mount it on /mnt/secret with filesystem ext3.
3. Create a group named "sysadmin"
   A user curly and larry should belongs to “sysadmin" group as a secondary group . A user node should not have access to interactive shell and he should not be a member of “sysadmin"
   group. passwd for all user created should be "jenny".

4. Create the Directory "/home/manager" with the following characteristics. Group ownership of
   "/home/manager" should go to "manager" group. The directory should be have full permission
   for all members off "manager" group but not to any other users accept "root". Files created
   under "/home/manager" should get the same group ownership is set to the "manager" group

5. The user sarah must configure a cron job that runs daily at 14:23. and executes "/bin/echo "hyer" and deny the user max for creating cronjob

6. Resize the lvm "/dev/vgsrv/home" so that after reboot size should be in between 90MB to 120MB

7. Configure your system as "NTP" client for "instructor.example.com".

8. Note the following. instructor.example.com(192.168.0.254) "Nfs exports" /home/guests to your system where "x" is your station ip. Ldapuser's home directory is instructor. example.com:/home/guests/ldapuserX. Ldapuser's home directory should be automounted locally beneath at /home/guests/ldapuserX. While login with any of the ldapuser then only home directory should accesible from your system that ldapuserX.

9: Copy the file /etc/fstab to /var/tmp and configure the "ACL" as mention following. The file /var/tmp/fstab is owned by the "root". The file /var/tmp/fstab belongs to the group "root" The file /var/tmp/fstab should not be executable by other's. The user "sarah" should able to read and write to the file. The user "natasha" can neither read nor write to the file. other users (future and current) shuold be able to read /var/tmp/fstab.

10: Create the user "dax" with uid 4223

11: Extend the SWAP space with "250" MB dont remove the existing swap.

12: Configure FTP access from your system. Clients within the remote.test should not have anonomyous FTP access to your system.

13: locate the files of owner "dax" and copy to the directory /root/found directory

14: List all lines which have string "enter" from "/usr/share/dict/words" file and copy the lines in /root/word. found.

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II Year MCA **III Semester**

CASE TOOLS LAB

Prerequisites
A basic knowledge of programming.

Objectives
1. To provide knowledge of Software Testing Methods .
2. To develop skills in software test automation and management using latest tools.

Outcomes
1. Design and develop the best test strategies in accordance to the development model.

USING WINRUNNER-CASE TOOL

1. Recording in context sensitive mode and analog mode

2. GUI checkpoint for single property

3. GUI checkpoint for single object/window

4. GUI checkpoint for multiple objects

5. a) Bitmap checkpoint for object/window
   b) Bitmap checkpoint for screen area

6. Database checkpoint for Default check

7. Database checkpoint for custom check

8. Database checkpoint for runtime record check

9. a) Data driven test for dynamic test data submission
   b) Data driven test through flat files
   c) Data driven test through front grids
   d) Data driven test through excel test

10. a) Batch testing without parameter passing
    b) Batch testing with parameter passing
    c) Data driven batch

11. Silent mode test execution without any interruption

12. Test case for calculator in windows application

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II Year MCA **IV Semester**

JAVA AND WEB TECHNOLOGIES

Prerequisites

1. A course on "Computer Programming and Data Structures"
2. A course on "Objected-Oriented Programming Through Java"

Objectives

1. To learn the basic web concepts and Internet protocols
2. To introduce XML and processing of XML data
3. To introduce client side scripting with Javascript and DHTML
4. To introduce server side programming with Java servlets and JSP

Outcomes

1. Ability to create dynamic and interactive web sites
2. Gain knowledge of client side scripting using java sript and DHTML.
3. Demonstrate understanding of what is XML and how to parse and use XML data
4. Able to do server side programming with Java Servelets and JSP

UNIT I

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets; Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script
XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX.

UNIT II

Review of Applets, Class, Event Handling, AWT Programming
Introduction to Swing:
JApplet, Handling Swing Controls like Icons – Labels – Buttons – Text Boxes – Combo – Boxes – Tabbed Pains – Scroll Pains – Trees – Tables Differences between AWT Controls & Swing Controls Developing a Home page using Applet & Swing.

UNIT III

Java Beans Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizers, Java Beans APIIntroduction to Servelets: Lifecycle of a Serverlet, JSDK The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading Initialization parameters. The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.

UNIT IV

Introduction to JSP The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing.JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat
JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations.

UNIT V

Database Access Database Programming using JDBC Studying Javax.sql.* package Accessing a Database from a JSP Page Application – Specific Database Actions Deploying JAVA Beans in a JSP Page. Introduction to struts framework.

TEXT BOOKS:

1. Internet and World Wide Web – How to program by Dietel and Nieto Pearson Education Asia. (Chapters: 3, 4, 8, 9, 10, 11, 12 – 18)
2. The complete Reference Java 2 Third Edition by Patrick Naughton and Herbert Schildt. (Chapters: 19, 20, 21, 22, 25, 27)
3. Java Server Pages by Hans Bergstan. (Chapters: 1 – 9)

REFERENCE BOOKS:

1. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
2. Jakarta Struts Cookbook, Bill Siggelkow, S P D O'Reilly for chap 8.
3. Murach's beginning JAVA JDK 5, Murach, and SPD
4. An Introduction to web Design and Programming –Wang-Thomson
5. Web Applications Technologies Concepts-Knuckles,John Wiley
6. Programming world wide web-Sebesta,Pearson
7. Building Web Applications-NIIT, PHI
8. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Thomas
9. Beginning Web Programming-Jon Duckett WROX.
10. Java Server Pages, Pekowsky, Pearson.

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II Year MCA **IV Semester**

DATA WAREHOUSING AND DATAMINING

Prerequisites

1. A course on "Database Management Systems"
2. Knowledge of probability and statistics

Objectives

- This course presents the techniques for preprocessing data before mining, and describes the concepts related to data warehousing, On-Line Analytical Processing (OLAP), and data generalization.
- It also presents methods for mining frequent patterns, associations, and correlations.
- It then describes methods for data classification and prediction, and data-clustering approaches.

Outcomes

1. Ability to understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
2. Apply preprocessing methods for any given raw data.
3. Devise efficient and cost effective methods for designing data warehouses.
4. Extract interesting patterns from large amounts of data.
5. Discover the role played by data mining in various fields.
6. Choose and employ suitable data mining algorithms to build analytical applications
7. Evaluate the accuracy of supervised and unsupervised models and algorithms.

UNIT-I
DATA MINING

Data-Types of Data-, Data Mining Functionalities- Interestingness Patterns-Classification of Data Mining systems- Data mining Task primitives -Integration of Data mining system with a Data warehouse-Major issues in Data Mining-Data Preprocessing.

UNIT-II
DATA WAREHOUSE AND BUSINESS ANALYSIS

Data Warehouse-Data Warehouse Architecture- Multidimensional Data Model-Data cube and OLAP Technology-Data Warehouse Implementation -DBMS schemas for Decision support - Efficient methods for Data cube computation.

UNIT-III
ASSOCIATION RULE MINING AND CLASSIFICATION

Mining Frequent Patterns-Associations and correlations- Mining Methods- Mining Various kinds of Association Rules- Correlation Analysis- Constraint based Association mining.- Classification and Prediction**-** Basic concepts-Decision tree induction-Bayesian classification, Rule-based classification - classification by Back propagation,-Support vector machines-.Associative Classification, Lazy learners-Other classification methods – Prediction.

UNIT-IV
CLUSTERING AND APPLICATIONS

Cluster analysis-Types of Data in Cluster Analysis-Categorization of Major Clustering Methods- Partitioning Methods,-Hierarchical Methods- Density-Based Methods,-Grid-Based

Methods,-Model-Based Clustering Methods- Clustering high dimensional data-Constraint-Based cluster analysis-Outlier Analysis

UNIT V

MINING DATA STREAMS, TIME-SERIES AND SEQUENCE DATA

Basic concepts- Mining data streams-Mining Time-series data--Mining sequence patterns in Transactional databases-.Mining Object- Spatial- Multimedia-Text and Web data**-** Spatial Data mining- Multimedia Data mining--Text Mining- Mining the World Wide Web.

Text Books:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER, Elsevier.
2. Data Warehousing, Data Mining &OLAP- Alex Berson and Stephen J. Smith- Tata McGraw-Hill Edition, Tenth reprint 2007

References:

1. Building the DataWarehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd..
2. Data Mining Introductory and Advanced topics –MARGARET H DUNHAM, PEA.

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II Year MCA **IV Semester**

ANDROID APPLICATION DEVELOPMENT

Prerequisites:
- A Course on JAVA
- A Course on DBMS

Objectives:
- To demonstrate their understanding of the fundamentals of Android operating systems
- To improves their skills of using Android software development tools
- To demonstrate their ability to develop software with reasonable complexity on mobile platform
- To demonstrate their ability to deploy software to mobile devices
- To demonstrate their ability to debug programs running on mobile devices

Outcomes:
- Student understands the working of Android OS Practically.
- Student will be able to develop Android user interfaces
- Student will be able to develop, deploy and maintain the Android Applications.

Unit I:
Introduction to Android Operating System:Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools
Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes
Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

Unit II:
Android User Interface:Measurements – Device and pixel density independent measuring units Layouts – Linear, Relative, Grid and Table Layouts
User Interface (UI) Components – Editable and non editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers
Event Handling – Handling clicks or changes of various UI components
Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

Unit III
Intents and Broadcasts:Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS

Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity
Notifications – Creating and Displaying notifications, Displaying Toasts

Unit IV
Persistent Storage:Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference
Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

Unit V
Advanced Topics: Alarms – Creating and using alarms
Using Internet Resources – Connecting to internet resource, using download manager
Location Based Services – Finding Current Location and showing location on the Map, updating location

Text Books:
1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

References:
1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

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II Year MCA **IV Semester**

SCRIPTING LANGUAGES

Prerequisites
- A course on "Computer Programming and Data Structures"
- A course on "Object Oriented Programming Concepts"

Objectives
- This course provides an introduction to the script programming paradigm
- introduces scripting languages such as Perl, PHP and Python.
- Learning TCL

Outcomes
- Comprehend the differences between typical scripting languages and typical system and application programming languages.
- Gain knowledge of the strengths and weakness of Perl, PHP TCL and Python; and select an appropriate language for solving a given problem.
- Acquire programming skills in scripting language
- Able to design web pages using Advanced PHP feature.

UNIT – I Introduction to PERL and Scripting
Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages,Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT – II Advanced perl
Finer points of looping, pack and unpack, filesystem, eval, datastructures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Isses.

UNIT – III PHP Basics
PHP Basics- Features,Embedding PHP Code in your Web pages,Outputting the data to the browser, Datatypes, Variables, Constants,expressions,string interpolation, control structures . Function,Creating a Function,Function Libraries,Arrays,strings and Regular Expressions.
PHP and Web Forms, Files, PHP Authentication and Methodolgies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

UNIT - IV TCL
TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.
Tk

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding , Perl-Tk.

UNIT – V Python

Introduction to Python langauge, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python,Exception Handling.

Integrated Web Applications in Python – Building Small, Efficient Python Web Systems ,Web Application Framework.

TEXT BOOKS:

1. The World of Scripting Languages , David Barron,Wiley Publications.
2. Python Web Programming , Steve Holden and David Beazley ,New Riders Publications.
3. Beginning PHP and MySQL , 3rd Edition , Jason Gilmore,Apress Publications (Dream tech.).

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux Apache,MySQL,Perl and PHP,J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development ,Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I.Bayross and S.Shah,The X Team,SPD.
5. Core Python Programming,Chun,Pearson Education.
6. Guide to Programming with Python,M.Dawson,Cengage Learning.
7. Perl by Example,E.Quigley,Pearson Education.
8. Programming Perl,Larry Wall,T.Christiansen and J.Orwant, O'Reilly, SPD.
9. Tcl and the Tk Tool kit,Ousterhout,Pearson Education.
10. PHP and MySQL by Example,E.Quigley,Prentice Hall(Pearson).
11. Perl Power,J.P.Flynt,Cengage Learning.
12. PHP Programming solutions,V.Vaswani,TMH.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year MCA **IV Semester**

Dept. Elective – I
SOFT COMPUTING

Prerequisites
- A course on "Computer Programming and Data Structures"
- A course on "Object Oriented Programming Concepts"

Objectives
- This course provides an introduction to the script programming paradigm
- Introduces scripting languages such as Perl, PHP and Python.
- Learning TCL

Outcomes
- Comprehend the differences between typical scripting languages and application programming languages. Acquire programming skills using scripting languages.
- Gain knowledge of the strengths and weakness of Perl, PHP, TCL and Python; and select an appropriate language for solving a given problem
- Ability to design web pages using advanced features of PHP.

UNIT-I
AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation-Using Predicate Logic and Rules.

UNIT-II
Supervised Learning Networks-perceptron, Back propagation algorithm-Classification Problem-Speech Processing Case study.
Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization,

UNIT-III
Introduction to Classical Sets (crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations.
Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

UNIT-IV
Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making
Fuzzy Logic Control Systems. Genetic Algorithm- Introduction and basic operators and terminology.Applications: Optimization of TSP, Internet Search Technique

UNIT-V
Genetic Algorithms-Introduction, Biological background, Search space, Basic technologies, Simple and general genetic algorithms, Operations in genetic algorithms, Stopping criteria and constraints in genetic algorithms, Problem solving using genetic algorithms.

Text Books:

1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007
2. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva,. Pearson Edition, 2004.

Reference Books :

1. Artificial Intelligence and SoftComputing- Behavioural and Cognitive Modelling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
2. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.
3. Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.
4. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
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II Year MCA **IV Semester**

Dept. Elective – I
SOFTWARE PROJECT MANAGEMENT

Prerequisites
- 1. A course on "Software Engineering"

Objectives
- To develop skills in software project management
- The topics include-software economics; software development life cyle; artifacts of the process; workflows; checkpoints; project organization and responsibilities; project control and process instrumentation;

Outcomes
- Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation.
- Analyze the major and minor milestones, artifacts and metrics from management and technical perspective.
- Design and develop software product using conventional and modern principles of software project management

UNIT I

Conventional Software Management: The waterfall model, conventional software Management performance.

Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT II

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections. **The old way and the new:** The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT III

Life cycle phases: ***Engineering and production stages, inception, Elaboration, construction, transition phases.***

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. **Model based software architectures:** A Management perspective and technical perspective. **Work Flows of the process:** Software process workflows, Iteration workflows.

UNIT IV

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments. Iterative Process Planning**:** work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

Project Organizations and Responsibilities**:** Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation**:** Automation Building blocks, The Project Environment.

UNIT V

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process**:** Process discriminates.

Future Software Project Management: modern Project Profiles, Next generation Software economics, modern process transitions.

Case Study: The command Center Processing and Display system- Replacement (CCPDS-R).

TEXT BOOKS:

1. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year MCA **IV Semester**

Dept. Elective – I
DIGITAL FORENSICS

Prerequisites : --Nil—
Objectives:
- To gain understanding of Network intrusion and Cybercrime
- To understand forensic analysis of large amount of data & social networks.

Outcomes:
- Ability to use the current computer forensics tools
- Obtain skills for operating system forensics
- Abiltity to perform forensic investigation on data & image files.

Unit I :
Investigation Procedure & Response – Computer Forensics in Today's World, Computer Forensics Lab, Computer Investigation Process, First Responder Procedure, Incident Handling, Investigative Reports.

Unit II:
Investigative Hard Disk, Files & Operating Systems-Understanding File System & Hard Disk, Understanding Digital Media Devices, Windows, Linux & Macintosh Boot Process, Windows Forensics, Linux Forensics, Application Password Crackers.

Unit-III:
Investigating Data & Image Files-Steganography, Data Acquisition & Duplication, Forensics Investigation using EnCase, Recovering Deleted Files & Deleted Partitions, Image File Forensics.

Unit-IV:
investigating Network Intrusion & Cybercrime – Network Forensics Investigation Logs, Investigating Network Traffic, Investigating Web Attack, Router Forensics, Investigating DoS Attack, Investigating Internet Crime, Tracking E-Mails & Investigating E-Mail Crimes, Investigating Corporate Espionage, Investigating Trademark & Copyright Infringement, Investigating Sexual Harassment Incidents, Investigating Child Pornography.

Unit-V:
Investigating Wireless Networks & Devices – Investigating Wireless Attacks, PDA Forensics, IPod & I Phone Forensics, Blackberry Forensics, Cyber Forensics in Cloud Computing environment, Dealing with anti-forensics strategies, Dealing with large amount of data, Forensics analysis of Social networks, Examining encrypting devices.

Text Books:
1. Computer Forensics (5 volume Set) mapping to CHFI (Certified Hacking Forensics Investigator), by EC-Council (international Council of Electronic Commerce Consultants):
   a) Computer forensics: investigation procedure and response, Vol. 1 of 5,
   b) Computer forensics: investigating hard disk, file and operating systems, Vol. 2 of 5,
   c) Computer forensics: investigating data and image files, Vol. 3 of 5,
   d) Computer forensics: investigating networks intrusions and cybercrime, Vol. 4 of 5,
   e) Computer forensics: investigating wireless networks and devices, Vol. 5 of 5.

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JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year MCA **IV Semester**

Dept. Elective – I
INFORMATION SECURITY & AUDIT CONTROL

Prerequisites

- ---NIL---

Objectives

- Introduces the basic concepts of Information System Auditing..
- To understand The Management Control Frameworks and The Application Control Framework.

Outcomes

- Understand function of Information Systems Audit and Management
- To acquire skills on Evidence Collection & Evaluation

Unit -I

Overview of Information System Auditing-Conducting an Information Systems Audit, Overview & steps in an Audit.

Unit-II

The Management Control Framework-I: Introduction, Systems Development Management Controls, Security Management Controls, Operations management Controls, Quality assurance Management Controls.

Unit -III

The Application Control Framework-I : Boundary Controls, Input Controls, Processing Controls, Database Controls, output Controls.

Unit -IV

Evidence Collection & Evaluation: Audit Software, Code Review, Test Data, and Code Comparison, Concurrent Auditing techniques, Interviews, Questionnaires ,and Control Flowcharts. Performance Management tools. Evaluating Asset Safeguarding and Data Integrity, Evaluating System Effectiveness, Efficiency.

Unit-V

Information Systems Audit and Management: Managing the Information Systems Audit Function, Introduction, Planning Function, Organising Function, Staffing Function, Leading Function, Controlling Function, Some Features of Information Systems Auditing.

Text Books:

- Ron Weber: Information Systems Control and Audit, Pearson, 2006.

References:

- James A.Hall: Information Technology Auditing and Assurance, Cengage. 2008.
- Davis: IT Auditing, TMH, 2007
- David Ricchiute: Auditing and Assurance Services, 7/e, Cengage, 2008.
- Cannon, Bergmann, Pamplin: CICA- Certified Information Systems Auditor, Study Guide, 1/e , Sybex, WILEY- India, 2006.
- Ronald, Russel: The CISSP prep Guide, 2/e. Wiley, Dreamtech, 2006.
- Alter: Information Systems, Pearson, 20

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
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II Year MCA **IV Semester**

Open Elective
PROFESSIONAL ETHICS

Prerequisites:--- Nil ----

Objectives

- To introduce the basic concepts of universal human values
- To familiarize the students with desirable business and professional ethics, rights and responsibilities
- To prepare students against possible gaps and unethical practices in contemporary times
- To sensitise the students so that they can protect themselves and the organization from the possible professional crime malpractices

Outcomes

- The students learn about diverse ethical issues rooted in society, trade, business, and environment on local as well as a global platform.
- The students appreciate their role as a responsible citizen, professional, and as managers, advisors, experts and consultants.
- The students will reflect and learn major values and ethics from their observations of a spiritual discourse and a visit to a business organization as a practical part of this course.

Unit I Human Values: Morals, values, ethics – integrity – work ethics –service learning – civic virtue – respect for others- living peacefully - Caring –sharing –honesty – courage – valuing time – cooperation – commitment –empathy – self-confidence –spirituality – character- Mini-Cases

Unit II Professional Ethics: Profession- and professionalism - Two models of professionalism –Professional etiquette -Three types of Ethics or morality Responsibility in Engineering – Engineering standards –Engineering Ethics – Positive and Negative Faces. Professional Codes and Code of conduct of Institute of Engineers. Mini-cases.

Unit III Professional Responsibilities: Ethical standards Vs Professional Conduct – Zero Tolerance for Culpable Mistakes – Hazards and Risks- Risk benefit analysis– congeniality, collegiality and loyalty. Respect for authority – conflicts of interest –Mini-Cases.

Unit IV Professional Rights: professional rights and employee rights communicating risk and public policy – Whistle blowing - Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership- Regulatory compliances, Monitoring and control- Mini-Cases

Unit V Ethics in global context: Global issues in MNCs- Problems of bribery, extortion, and grease payments – Problem of nepotism, excessive gifts – paternalism – different business practices – negotiating taxes. Mini-Cases.

Mini-projects

Project 1: The student of this course should invariably attend (or watch on internet/any TV channel/youtube/social media) two speeches of 30 minutes duration each dealing with spiritual discourse and submit a report on the contents of the lecture proceedings.

Project 2: Visit any organization (including shops/ hotels or shopping malls in your region) of your choice and observe how the professionals perform the given job with a focus on professional ethics and human values.

References

1. Aryasri, *Human Values and Professional Ethics*, Maruthi Publications.
2. S B George, *Human Values and Professional Ethics,* Vikas Publishing.
3. KR Govindan & Saenthil Kumar:Professional *Ethics and Human Values*, Anuradha Publications.
4. S K Chakraborthy & D.Chakraborthy: *Human Values and Ethics*, Himalaya.
5. M. Govindarajan, S. Natarajan, & V.S. Senthilkumar: *Engineering Ethics(Includes Human Values),* HI Learning Pvt. Ltd., New Delhi – 110001

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year MCA **IV Semester**

Open Elective
INTELLECTUAL PROPERTY RIGHTS & CYBER LAWS

Prerequisites

Objectives

- Introduces the basic concepts of intellectual properties Rights and Cyber Laws..
- To understand Trademark Registration Process
- Explains Copyright Ownership and Law of Patents

Outcomes

- Students are enabled with techniques of protecting IPRS
- Students are enabled and appreciate consequences acts which relate IT act 2000

UNIT I

Introduction to intellectual property, Law of Trademarks, trademark Selection & Searching, IP Law- Types of IP- Agencies for IP Registration- International Treaties. Purpose and Function of Trademarks Rights- Categories of marks- Trade names and Business names-protectable matter. Selection and Evaluation of a mark- Trademark search.

UNIT II

Trademark Registration Process, Post-registration Procedures, Trademarks Maintenance, Transfer of Rights to Marks, Preparing and filling the applications- Docketing Critical Dates-Examination Process- Post-examination procedure- Registration. Affidavit of Continued use-Affidavit of incontestability- Renewal of Registrations–Docketing Requirements- Loss of Trademarks Rights- Trademark use and Compliance Policies- Trademark Policing and Maintenance – Use of Marks Owned by Third Parties- Transfer of Ownership or Rights in Trademarks.

UNIT III

Inter Partes Proceedings, Infringement, Dilution, New developments in Trademark Law
Inter parts proceedings – Infringement of Trademarks –Dilution of Trademarks- Related Trademarks claims. Protecting a Domain Name - Other Cyberspace Trademark issues.
Law of Copyright, Subject Matter Of Copyright, Rights Afforded By Copyright Law
Foundations of Copyrights Law- Originality of Material-Fixation of Material– Exclusions from Copyright Protection- Compilations, Collections and Derivative Works. Rights of Reproduction- Rights to Prepare Derivative works- Rights of Distribution- Rights to perform the work publicly- Rights to display the work publicly - Limitations on exclusive rights

UNIT IV

Copyright Ownership, Transfers, Duration, Registration and Searching Copyright Ownership issues- joint works – ownership in derivative works – works made for hire- transfers of copyright- termination of Transfers of copyright- duration of copyright. Copyright registration. Application-Deposit Materials-Application Process and Registration of Copyright-Searching Copyright Office Records- Obtaining Copyright Office Records and Deposit Materials-Copyright Notice.
Copyright Infringement, New Developments in Copyright Law, semi conductor chip protection act**:** Elements of Infringement – Contributory Infringement and Vicarious

Infringement – Defenses to Infringement – Infringement Actions – Remedies for Infringement. Copyright Protection for Computer Programs – Copyright Protection for Automated Databases – Copyright in the Electronic age – The Digital Millennium Copyright Act – Recent Developments in Copyright Law –Terms of the Trade – Vessel Hull Protection – Semiconductor Chip Protection.

UNIT V

Law of Patents, Patent Searches, Ownership, Transfer: Patentability – Design Patents – Double Patenting – Patent Searching – Patent Application Process – Prosecuting the Application, Past-issuance Actions, Term and Maintenance of Patents. Ownership Rights – Sole and Joint Inventors – Disputes over Inventor ship – Inventions Made by Employees and Independent Contractors – Assignment of Patent Rights – Licensing of Patent Rights – Invention Developers and Promoters.

Patent Infringement, New Development and International Patent Law Direct infringement- Inducement to Infringe- Contributory Infringement- First Sale Doctrine- Claims Interpretation- Defenses to Infringement- Remedies for Infringement- Resolving an Infringement Dispute- Patent Infringement Litigation. New Development in Patent Law- International Patent Protection- Paris Convention- Patent Cooperation Treaty- Agreement on Trade Related Aspects of Intellectual Property Rights- Patent Law Treaty.

TEXT BOOKS:

1. Intellectual Property Rights by Deborah E. Bouchoux, Cengage Learning.

REFERENCE BOOKS:

1. Managing Intellectual Property- The Strategic Imperative, Second Edition by Vinod v. Sople, PHI Learning Private Limited.
2. Intellectual Property- Copyrights, Trademarks, and Patents by Richard Stim, Cengage Learning.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year MCA **IV Semester**

Open Elective
ETHICAL HACKING

Prerequisites
- A course on "Computer Networks"
- A course on "Network Security and Cryptography"

Objectives
- To introduce the methodologies and framework of ethical hacking for enhancing the security.

Outcomes
- Gain the knowledge of the use and availability of tools to support an ethical hack
- Gain the knowledge of interpreting the results of a controlled attack
- Comprehend the dangers associated with penetration testing

UNIT I
Introduction: Hacking Impacts, The Hacker
Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration
Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture
Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking

UNIT II
The Business Perspective: Business Objectives, Security Policy, Previous Test Results, Business Challenges
Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, Timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement

UNIT III
Preparing for a Hack: Technical Preparation, Managing the Engagement
Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance

UNIT IV
Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase
Exploitation: Intutive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern

UNIT V
Deliverable: The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation
Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion

TEXT BOOK

1. James S. Tiller, “The Ethical Hack: A Framework for Business Value Penetration Testing”, Auerbach Publications, CRC Press

REFERENCE BOOKS

1. EC-Council, “Ethical Hacking and Countermeasures Attack Phases”, Cengage Learning
2. Michael Simpson, Kent Backman, James Corley, “Hands-On Ethical Hacking and Network Defense”, Cengage Learning

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
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II Year MCA **IV Semester**

Open Elective
ENGINEERING MANAGEMENT

Prerequisite:
- A course on " Accountancy and Financial Management"
- A course on " Management Information Systems"

objectives:
- To sensitize and orient the future engineers about the challenges in managing engineering enterprises
- To learn how to provide value through innovations, leadership in technology projects, and the application of emerging technologies through web-based tools.

outcomes:
- The student learns how to manage operations in engineering organizations.
- The students will be enabled to become better engineering leaders who can manage personnel, projects, products, and services.
- This course will enable the students to do their professional engineering practice through the nuances of engineering management.

Unit-I
Introduction to Engineering Management - Management Challenges For Engineers – Planning –Organizing –Leading- Controlling.

Unit-II
Value Engineering: Cost Reduction Vs Cost control- Cost Management – Value engineering methodologies

Unit-III
Operations and Marketing Management: Production planning and control –Process planning – New product design – Maintenance Management – Marketing Management for Engineering Managers.

Unit-IV
Engineers as Managers/Leaders- Ethics In Engineering/Business Management. – Business Process Re-engineering-Ergonomics.

Unit-V
Advanced Manufacturing Technologies and systems -Web-Based Enablers For Engineering And Management – Managerial Issues relating to CAD/CAM//CAE- High performance Computing.

Text Book:
1. C M Chang, Engineering Management: Challenges in the New Millennium, Pearson, 2013.

References:
1. Martand Telsang, Industrial Engineering and Production Management,, S. Chand, Second edition.
2. A.K. Gupta, Engineering Management, S. Chand, 2010

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II Year MCA **IV Semester**

WEB PROGRAMMING LAB

Prerequisites
- A Course on "Computer Programming and Data Structures"
- A Course on "Objected Oriented Programming through Java"

Co-requisites
- A course on "Web Technologies"

Objectives
- To provide hands-on experience on web technologies
- To develop client-server application using web technologies
- To introduce server side programming with Java servlets and JSP
- To introduce client side scripting with Javascript and AJAX

Outcomes
- Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML
- Apply client-server principles to develop scalable and enterprise web applications.

List of Experiments:

1. Develop static pages (using Only HTML) of an online book store. The pages should resemble: www.amazon.com. The website should consist the following pages.
   a) Home page
   b) Registration and user Login
   c) User Profile Page
   d) Books catalog
   e) Shopping Cart
   f) Payment By credit card
   g) Order Conformation

2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

3. Create and save an XML document on the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.

4. Bean Assignments
   a. Create a JavaBean which gives the exchange value of INR (Indian Rupees) into equivalent American/Canadian/Australian Dollar value.
   b. Create a simple Bean with a label - which is the *count* of number of clicks. Then create a BeanInfo class, such that only the "*count*" property is visible in the Property Window.
   c. Create two Beans- a)KeyPad. b)DisplayPad.
      After that integrate the two Beans to make it work as a Calculator.
   d. Create two Beans: Traffic Light(Implemented as a Label with only three background colours - Red,Green,Yellow) and Automobile (Implemented as a TextBox which states its state/movement). The state of the Automobile should depend on the

following Light Transition Table.

Light Transition	Automobile State
Red ---> Yellow	Ready
Yellow ---> Green	Move
Green --> Red	Stopped

5. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

6. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

TEXT BOOKS:

1. WEB TECHNOLOGIES: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education

REFERENCES:

1. Deitel H.M. and Deitel P.J., “Internet and World Wide Web How to program”, Pearson International, 2012, 4th Edition.
2. J2EE: The complete Reference By James Keogh, McGraw-Hill
3. Bai and Ekedhi, The Web Warrior Guide to Web Programming, Thomson
4. Paul Dietel and Harvey Deitel,”Java How to Program”, Prentice Hall of India, 8th Edition
5. Web technologies, Black Book, Dreamtech press.
6. Gopalan N.P. and Akilandeswari J., “Web Technology”, Prentice Hall of India

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II Year MCA **IV Semester**

ANDROID PROGRAMMING LAB

Prerequisites: --- NIL---

Objectives:
- To learn how to develop Applications in android environment.
- To learn how to develop user interface applications.
- To learn how to develop URL related applications.

Objectives:
- Student understands the working of Android OS Practically.
- Student will be able to develop userinterfaces.
- Student will be able to develop, deploy and maintain the Android Applications.

The student is expected to be able to do the following problems, though not limited.

1. Create an Android application that shows Hello + name of the user and run it on an emulator. (b) Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.

2. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout.

3. Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a “Back” button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on right fragment instead of second screen with back button. Use Fragment transactions and Rotation event listener.

4. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.

5. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.

6. Create an application that uses a text file to store user names and passwords (tab separated fields and one record per line). When the user submits a login name and password through a screen, the details should be verified with the text file data and if they match, show a dialog saying that login is successful. Otherwise, show the dialog with Login Failed message.

7. Create a user registration application that stores the user details in a database table.

8. Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.

9. Create an admin application for the user table, which shows all records as a list and the admin can select any record for edit or modify. The results should be reflected in the table.

10. Develop an application that shows all contacts of the phone along with details like name, phone number, mobile number etc.

11. Create an application that saves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts.

12. Create an alarm that rings every Sunday at 8:00 AM. Modify it to use a time picker to set alarm time.

13. Create an application that shows the given URL (from a text field) in a browser.

    Develop an application that shows the current location's latitude and longitude continuously as the device is moving (tracking).

14. Create an application that shows the current location on Google maps.

Note:
Android Application Development with MIT App Inventor:For the first one week, the student is advised to go through the App Inventor from MIT which gives insight into the various properties of each component.
The student should pay attention to the properties of each components, which are used later in Android programming. Following are useful links:
1. http://ai2.appinventor.mit.edu
2. https://drive.google.com/file/d/0B8rTtW_91YclTWF4czdBMEpZcWs/view

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III Year MCA **V Semester**

MOBILE COMMERCE

Prerequisites

- ---NIL---

Objectives

- Explains topics like E-commerce and Mobile commerce
- To understand BUSINESS– TO– BUSINESS MOBILE E– COMMERCE

Outcomes

- Understand how to apply E-commerce in the business
- Apply Mobile commerce theory in the business.

UNIT I
ELECTRONIC COMMERCE 9
Traditional commerce and E-commerce – Internet and WWW – Role of WWW – Value Chains – Strategic Business And Industry Value Chains – Role of E-commerce. Packet Switched Networks – TCP/IP Protocol Script – Internet Utility Programmes – SGML, HTML And XML – Web Client And Servers – Web Client/Server Architecture – Intranet And Extranets – Web Based Tools For E-commerce – Security.

UNIT II
MOBILE COMMERCE 9
Introduction – Infrastructure of M–Commerce – Types Of Mobile Commerce Services – Technologies Of Wireless Business – Benefits And Limitations, Support, Mobile Marketing & Advertisement, Non– Internet Applications In M–Commerce – Wireless/Wired Commerce Comparisons.

UNIT III
MOBILE COMMERCE: TECHNOLOGY 9
A Framework For The Study Of Mobile Commerce – NTT Docomo's I-Mode – Wireless Devices For Mobile Commerce – Towards A Classification Framework For Mobile Location Based Services – Wireless Personal And Local Area Networks –The Impact Of Technology Advances On Strategy Formulation In Mobile Communications Networks.

UNIT IV
MOBILE COMMERCE: THEORY AND APPLICATIONS 9
The Ecology Of Mobile Commerce – The Wireless Application Protocol – Mobile Business Services – Mobile Portal – Factors Influencing The Adoption of Mobile Gaming Services – Mobile Data Technologies And Small Business Adoption And Diffusion – E–commerce in The Automotive Industry – Location– Based Services: Criteria For Adoption And Solution Deployment – The Role of Mobile Advertising In Building A Brand – M–commerce Business Models

UNIT V
BUSINESS– TO– BUSINESS MOBILE E– COMMERCE 9
Enterprise Enablement – Email and Messaging – Field Force Automation (Insurance, Real Estate, Maintenance, Healthcare) – Field Sales Support (Content Access, Inventory) – Asset

Tracking and Maintenance/Management – Remote IT Support – Customer Retention (B2C Services, Financial, Special Deals) – Warehouse Automation – Security.

TEXT BOOKS

1. E.Brian Mennecke, J.Troy Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group Inc., IRM press, 2003.
2. Ravi Kalakota, B.Andrew Whinston, "Frontiers of Electronic Commerce", Pearson Education, 2003.

REFERENCES

1. P. J. Louis, "M-Commerce Crash Course", McGraw- Hill Companies February 2001.
2. Paul May, "Mobile Commerce: Opportunities, Applications, and Technologies Of Wireless Business" Cambridge University Press March 2001.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year MCA **V Semester**

INFORMATION SECURITY

Prerequisites

- 1. A Course on "Computer Networks, Mathematics

Objectives

- Understand information security's importance in our increasingly computer-driven world..
- Master the key concepts of information security and how they "work."
- To understand the fundamentals of Cryptography
- To understand the various key distribution and management schemes
- To understand how to deploy encryption techniques to secure data in transit across data networks
- To apply algorithms used for secure transactions in real world applications

Outcomes

- Demonstrate the knowledge of cryptography and network security concepts and applications.
- Ability to design different public & private key cryptography algorithms.
- Ability to identify and investigate vulnerabilities and security threats and mechanisms to counter them.

UNIT I

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security.
Classical Encryption Techniques, DES, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operation, Blowfish, Placement of Encryption Function, Traffic Confidentiality, key Distribution, Random Number Generation.

UNIT II

Public key Cryptography Principles, RSA algorithm, Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Cryptography.
Message authentication and Hash Functions , Authentication Requirements and Functions, Message Authentication, Hash Functions and MACs Hash and MAC Algorithms SHA-512, HMAC.

UNIT III

Digital Signatures, Authentication Protocols, Digital signature Standard, Authentication Applications, Kerberos, X.509 Directory Authentication Service.
Email Security: Pretty Good Privacy (PGP) and S/MIME.

UNIT IV

IP Security:
Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT V

Intruders, Viruses and Worms Intruders, Viruses and related threats Firewalls: Firewall Design Principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS:

1. Cryptography and Network Security (principles and approaches) by William Stallings Pearson Education, 4th Edition.

REFERENCE BOOKS:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Principles of Information Security, Whitman, Thomson.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
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III Year MCA **V Semester**

BIG DATA ANALYTICS

Prerequisites

- Data Mining

Objectives

- The purpose of this course is to provide the students with the knowledge of Big data Analytics principles and techniques.
- This course is also designed to give an exposure of the frontiers of Big data

Outcomes

- Ability to explain the foundations, definitions, and challenges of Big Data and Analytics.
- Apply Big Data technologies in Text/Speech Analytics.
- Ability to program using HADOOP and Map reduce, NOSQL

UNIT 1:
Introduction to Big data, Challenges of BD, Benefits of BD, characteristics of BD, How to use BD in your Business, BD analytics, BD Enterprise Model, Building BD Platform, Data intelligence, Data Science, Data Scientist.

UNIT 2:
Big Data storage, Big Data Architecture, Big Data Computation, Relational Data Base, Google Big Data services, Open Stack, Microsoft AZURE, and Integrating Data source, NOSQL

UNIT 3:
Apache Hadoop, Core Hadoop, Hadoop Lower Levels, HDFS, PIG, Hive, HBase, Data and NO SQL Planning for BD, Hadoop Data Storage and Analysis, HDFS: design, concepts, java interface, Hadoop file system, Hadoop pipes, streaming.

UNIT 4:
Map reduces types, I/O formats, counter, storing, joining Map Reduce Library Classes, Setting up Hadoop cluster, cluster specifications, setup and installation.

UNIT 5:
Big data Analytics, Emerging BD Practices, BD Analytics for Consumer Reports, BD Analytics for financial Science. Evolution of analytics, Text analytics, Speech analytics, Video/Image analytics, Transparency, Prediction vs. Privacy.

Text Books:

1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. Hadoop: The definitive guide, 3rd edition, tom white.
3. Big Data Hand Book for managers, Joni Salminen, Valtteri Kaartemo, Kindle Edition.

Reference:

1. Big Data and Hadoop, Kindle Edition.
2. Planning for Big Data, O'Reilly Radar team.

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III Year MCA **V Semester**

CLOUD COMPUTING

Prerequisites

- A course on "Computer Networks"
- A course on "Operating Systems"

Objectives

- This course provides an insight into cloud computing
- Topics include- distributed system models, service oriented architectures, cloud programming and software environments, resource management and cloud service models.

Outcomes

- Ability to understand various service delivery models of a cloud computing architecture.
- Ability to understand the ways in which the cloud can be programmed and deployed.
- Understanding Cloud Service Providers .

UNIT I: Computing Paradigms, High-Performance Computing, Parallel Computing.,Distributed Computing..,ClusterComputing.,Grid Computing, Cloud Computing., Biocomputing, Mobile Computing.,QuantumComputing, Optical Computing. Nanocomputing.

UNIT II: Cloud Computing Fundamentals: Motivation for Cloud Computing,The Need for Cloud Computing,Defining Cloud Computing, Definition of Cloud computing,Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing,Five Essential Characteristics...Four Cloud Deployment Models

UNIT III: Cloud Computing Architecture and Management: Cloud architecture, Layer,Anatomy of the Cloud,Network Connectivity in Cloud Computing, Applications, on the Cloud,Managing the Cloud,Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT IV: Cloud Service Models: Infrastructure as a Service,Characteristics of IaaS.Suitability of IaaS,Pros and Cons of IaaS,Summary of IaaS Providers,Platform as a Service,Characteristics of PaaS,Suitability of PaaS,Pros and Cons of PaaS,Summary of PaaS Providers,Software as a Service,Characteristics of SaaS,Suitability of SaaS,Pros and Cons of SaaS,Summary of SaaS Providers.Other Cloud Service Models

UNIT V: Cloud Service Providers:EMC,EMC IT,Captiva Cloud Toolkit,Google,Cloud Platform,Cloud Storage,Google Cloud Connect,Google Cloud Print,Google App Engine,Amazon Web Services,Amazon Elastic Compute Cloud,Amazon Simple Storage Service,Amazon Simple Queue ,ervice,Microsoft,Windows Azure,Microsoft Assessment and Planning Toolkit,SharePoint,IBM,Cloud Models,IBM SmartCloud,SAP Labs,SAP HANA Cloud Platform,Virtualization Services Provided by SAP,Salesforce,Sales Cloud,Service Cloud: Knowledge as a Service,Rackspace,VMware,Manjrasoft,Aneka Platform

TEXT BOOKS:

1. Essentials of cloud Computing : K.Chandrasekhran , CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing , Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year MCA **V Semester**

Dept. Elective-II
DISTRIBUTED SYSTEMS

Prerequisites
- A course on " Operating Systems"
- A course on "Network Security and Cryptography"

Objectives
- This course provides an insight into Distributed systems.
- Topics include- Peer to Peer Systems, Transactions and Concurrency control, Security and Distributed shared memory

Outcomes
- Ability to understand Transactions and Concurrency control.
- Ability to understand Security issues.
- Understanding Distributed shared memory.
- Abilty to design distributed systems for basic level applications.

UNIT I
Characterization of Distributed Systems-Introduction,Examples of Distributed systems,Resource sharing and web,challenges,System models-Introduction,Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication, Distributed objects and Remote Invocation-Introduction,Communication between distributed objects,RPC,Events and notifications, Case study-Java RMI.

UNIT II
Operating System Support- Introduction, OS layer,Protection,Processes and Threads, Communication and Invocation, Operating system architecture,Distributed File Systems-Introduction,File Service architecture,case study- SUN network file systems.
Name Services-Introduction, Name Services and the Domain Name System,Case study of the Global Name Service,Case study of the X.500 Directory Service.

UNIT III
Peer to Peer Systems–Introduction,Napster and its legacy,Peer to Peer middleware,Routing overlays,Overlay case studies-Pastry,Tapestry,Application case studies-Squirrel,OceanStore.
Time and Global States-Introduction,Clocks,events and Process states,Synchronizing physical clocks,logical time and logical clocks,global states,distributed debugging.
Coordination and Agreement-Introduction,Distributed mutual exclusion,Elections,Multicast communication,consensus and related problems.

UNIT IV
Transactions and Concurrency control-Introduction,Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.Distributed Transactions-Introduction,Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions,

Distributed deadlocks, Transaction recovery,Replication-Introduction,System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT V

Security-Introduction,Overview of Security techniques,Cryptographic algorithms,Digital signatures,Case studies-Kerberos,TLS,802.11 WiFi.

Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study,Other consistency models, CORBA case study-Introduction,CORBA RMI,CORBA Services.

TEXT BOOKS:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems,S.Ghosh,Chapman&Hall/CRC,Taylor&Francis Group,2010.

REFERENCE BOOKS:

1. Distributed Computing,S.Mahajan and S.Shah,Oxford University Press.
2. Distributed Operating Systems Concepts and Design,Pradeep K.Sinha,PHI.
3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, TMH.
4. Reliable Distributed Systems,K.P.Birman,Springer.
5. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, PearsonEducation.
6. Distributed Operating Systems and Algorithm Analysis,R.Chow,T.Johnson,Pearson.
7. Distributed Operating Systems,A.S.Tanenbaum,Pearson education.
8. Distributed Computing,Principles,Algorithms and Systems,Ajay D.Kshemakalyani and Mukesh Singhal,Cambridge,rp 2010.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
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III Year MCA **V Semester**

Dept. Elective-II
MACHINE LEARNING

Prerequisites
- Data Structures
- Knowledge on statistical methods

Objectives
- This course explains machine learning techniques such as decision tree learning, Bayesian learning etc.
- To understand computational learning theory.
- To study the pattern comparison techniques.

Outcomes
- Understand the concepts of computational intelligence like machine learning
- Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
- Understand the Neural Networks and its usage in machine learning application.

UNIT -I
Introduction - Well-posed learning problems, designing a learning system Perspectives and issues in machine learning
Concept learning and the general to specific ordering – Introduction, A concept learning task, concept learning as search, Find-S: Finding a Maximally Specific Hypothesis, Version Spaces and the Candidate Elimination algorithm, Remarks on Version Spaces and Candidate Elimination, Inductive Bias.
Decision Tree Learning – Introduction, Decision Tree Representation, Appropriate Problems for Decision Tree Learning, The Basic Decision Tree Learning Algorithm Hypothesis Space Search in Decision Tree Learning, Inductive Bias in Decision Tree Learning, Issues in Decision Tree Learning.

UNIT -II
Artificial Neural Networks Introduction, Neural Network Representation, Appropriate Problems for Neural Network Learning, Perceptions, Multilayer Networks and the Back propagation Algorithm.
Discussion on the Back Propagation Algorithm, An illustrative Example: Face Recognition
Evaluation Hypotheses – Motivation, Estimation Hypothesis Accuracy, Basics of Sampling Theory, A General Approach for Deriving Confidence Intervals, Difference in Error of Two Hypotheses, Comparing Learning Algorithms.

UNIT -III
Bayesian learning - Introduction, Bayes Theorem, Bayes Theorem and Concept Learning Maximum Likelihood and Least Squared Error Hypotheses, Maximum Likelihood Hypotheses for Predicting Probabilities, Minimum Description Length Principle , Bayes Optimal Classifier, Gibs Algorithm, Naïve Bayes Classifier, An Example: Learning to Classify Text, Bayesian Belief Networks, EM Algorithm.

Computational Learning Theory – Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Space, Sample Complexity for Infinite Hypothesis Spaces, The Mistake Bound Model of Learning.
Instance-Based Learning – Introduction, k-Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

UNIT -IV
Pattern Comparison Techniques, Temporal patterns, Dynamic Time Warping Methods, Clustering, Codebook Generation, Vector Quantization
Pattern Classification: Introduction to HMMS, Training and Testing of Discrete Hidden Markov Models and Continuous Hidden Markov Models, Viterbi Algorithm, Different Case Studies in Speech recognition and Image Processing

UNIT -V
Analytical Learning – Introduction, Learning with Perfect Domain Theories : PROLOG-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operations.
Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis.

Text Books:
1. Machine Learning – Tom M.Mitchell,-MGH
2. Fundamentals of Speech Recognition By Lawrence Rabiner and Biing – Hwang Juang.

Reference Books:
1. Machine Learning : An Algorithmic Perspective, Stephen Marsland, Taylor & Francis

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III Year MCA **V Semester**

Dept. Elective-II
BUSINESS INTELLIGENCE

Prerequisites:

- Data Mining and Data Warehousing

Objectives:

- It enables the student understand the concepts of Business Intelligence

Outcome:

- The student understands Data Ware Housing, Data Mining for Business Intelligence, Business Rules and Business Intelligence Implementation.

1. **UNIT-I**

Introduction to Business Intelligence-the Business pressure-Responses and support model-Definition of BI- Architecture of BI- Styles of BI-event-Driven alerts, A cyclic process of Intelligence Creation. The value of Business intelligence-Value driven and Information use-Performance metrics and key performance indicators-horizontal use cases for BI.

Case Study: 1 (Efraim Turban Pg no 26 & 107).

2. **UNIT-II**

Data Ware Housing-Definitions and concepts-DW process an Innovation-Data Warehousing Implementation-Data warehousing Administration-Security Issues and future trends. Business Performance Management-Overview Strategic plan, monitor, performance measurement, BPM methodologies-BPM Techniques-Performance dashboard and scorecards.

Case Studies: 2 (Efraim Turban.Pg no 125).

3. **UNIT-III**

Data mining for Business Intelligence-Data mining concepts and definitions-Data mining applications-Artificial neural Networks for data mining. Text and web mining-Natural language processing-Text mining applications-Text mining process-tools-Web mining overview-Web content overview-Web structure mining-Web usage mining.

Case Studies :3 (Efraim Turban.Pg no 228)

4. **UNIT-IV**

Business Rules-the value preposition of business rules-Business rules approach-Business rule system-sources of business rules and management approach.

5. **UNIT-V**

Business intelligence implementation-Business Intelligence and integration implementation-connecting in BI systems- Issues of legality- Privacy and ethics- Social networking and BI.

Text Book

- Efraim Turban et al.“Business Intelligence” 2e, Pearson Education, 2012.

References:

1. David Loshin “Business Intelligence” 2e, Elsevier, 2012.
2. Amit Johri “Business Intelligence” Himalaya, 2012.
3. Rajiv Sabherwal “Business Intelligence” Wiley Publications, 2012.
4. Carlo Vercellis “Business Intelligence” Wiley Publications, 2012.
5. Philo Janus, Stacia Misner, Building Integrated Business Intelligence Solutions with SQL Server, 2008 R2 & Office 2010, TMH, 2011.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year MCA **V Semester**

Dept. Elective-II
REAL TIME OPERATING SYSTEMS

Preriqusits:
- Computer Organization
- Microprocessors
- Operating Systems

Objectives:
- To provide students with a thorough understanding of the principles behind the structure and operation of real-time operating systems.

Outcomes:
- Distinguish a real-time system from other systems
- Identify the functions of operating system
- Evaluate the need for real-time operating system
- Implement the real-time operating system principles

UNIT – I:
Introduction to Real Time Operating Systems: Brief History of OS, Defining an RTOS, The Scheduler, Objects, Services, Key Characteristics of an RTOS
Tasks: Defining a Task, Task States and Scheduling, Typical Task Operations, Typical task Structure, Synchronization, Communication and Concurrency.
Semaphores: Defining Semaphores, Operations and Use, Defining Message Queue, States, Content, Storage, Operations and Use

UNIT - II:
Message Queues: Defining Message Queues, Message Queue states, Message Queue content, Message Queue Storage, Typical Message Queue operations, Typical Message Queue use
Kernel Objects: Pipes, Event Registers, Signals, Condition Variables
RTOS Services: Building Blocks, Component Configuration

UNIT- III:
Exceptions and Interrupts: What are Exceptions and Interrupts, Application of exceptions and Interrupts, A closer look at Exceptions and Interrupts, Processing General Exceptions, Nature of Spurious Exceptions
Timer and Timer Services: Real Time Clocks, Programmable Interval Timers, Timer Interrupt Service Routines, A Model for Implementing the Soft-Timer Handling Capacity, Timing Wheels

UNIT IV:
I/O Subsystem: Basic I/O Concepts, The I/O subsystem
Memory Management: Dynamic Memory allocation In Embedded Systems, Fixed Size Memory management, Blocking Vs NON-Blocking Memory Functions

UNIT V:

Synchronization and Communication: Synchronization, Communication, Resource Synchronozation Methods, Common Practical Design Patterns

Case Studies: RT Linux, MicroC/OS-II, Vx Works

TEXT BOOKS:

1. Real Time Concepts for Embedded Systems – Qing Li, Elsevier, 2011

REFERENCE BOOKS:

1. Embedded Systems- Architecture, Programming and Design by Rajkamal, 2007, TMH.
2. Advanced UNIX Programming, Richard Stevens
3. Embedded Linux: Hardware, Software and Interfacing – Dr. Craig Hollabaugh

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year MCA **V Semester**

Dept. Elective-III
DISTRIBUTED DATABASES

Prerequisites

1. A course on "Database Management Systems"

Objectives

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1. To acquire knowledge on parallel and distributed databases and its applications.
2. To study the usage and applications of Object Oriented databases.
3. To learn the modeling and design of databases
4. To acquire knowledge on parallel and distributed databases and its applications.
5. Equip students with principles and knowledge of parallel and object oriented databases.
6. Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database management systems.

Outcomes

1. Understand theoretical and practical aspects of distributed database systems.
2. Study and identify various issues related to the development of distributed database system.
3. Understand the design aspects of object oriented database system and related development.
4. Abilty to write global queries for distributed databases.

UNIT I

Features of Distributed versus Centralized Databases, Principles of Distributed Databases, Levels Of Distribution Transparency, Reference Architecture for Distributed Databases, Types of Data Fragmentation, Integrity Constraints in Distributed Databases, Distributed Database Design

UNIT II

Translation of Global Queries to Fragment Queries, Equivalence transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.

Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries

UNIT III

The Management of Distributed Transactions, A Framework for Transaction Management, Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions

Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT IV

Reliability, Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection

UNIT V

Architectural Issues, Alternative Client/Server Architectures, Cache Consistency, Object Management, Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Object Query Processor Architectures, Query Processing Issues, Query Execution, Transaction Management, Transaction Management in Object DBMSs, Transactions as Objects

Database Integration, Scheme Translation, Scheme Integration, Query Processing Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues Transaction Management Transaction and Computation Model, Multidatabase Concurrency Control, Multidatabase Recovery, Object Orientation and Interoperability, Object Management Architecture CORBA and Database interoperability, Distributed Component Object Model, COM/OLE and Database Interoperability, PUSH-Based Technologies

TEXT BOOKS:

1. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti,TMH.
2. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez , Pearson Education, 2nd Edition.

REFERENCE BOOKS:

1. Distributed Database Systems,Chanda Ray,Pearson.
2. Distributed Database Management Systems,S.K.Rahimi and Frank.S.Haug, Wiley.

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III Year MCA **V Semester**

Dept. Elective-III
WEB SERVICES & SERVICE ORIENTED ARCHITECTURE

Pre-requisites:
- The course assumes a reasonable comfort and background about Information Technology and Management Information Systems.

Objectives:
- To gain understanding of the basic principles of service orientation
- To learn service oriented analysis techniques
- To learn technology underlying the service design
- To learn the concepts such as SOAP, Registering and Discovering Services.

Outcomes:
At the end of this course, students are expected to gain the following learning:
- Get the foundations and concepts of service based computing
- Advocate the importance and means of technology alignment with business
- Understanding the basic operational model of web services,
- Gain the knowledge of key technologies in the service oriented computing arena
- Apply and practice the learning through a real or illustrative project/case study.

UNIT- I
Evolution and Emergence of Web Services – Evolution of distributed computing. Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

UNIT -II
Web Service Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services. Describing Web Services – WSDL introduction, non functional service description, WSDL1.1 Vs WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.

UNIT III
Brief Over View of XML – XML Document structure, XML namespaces, Defining structure in XML documents, Reuse of XML schemes, Document navigation and transformation. SOAP : Simple Object Access Protocol, Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures, SOA revisited, Service roles in a SOA, Reliable messaging, The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model, Error handling in SOAP.

UNIT – IV

Registering and Discovering Services : The role of service registries, Service discovery, Universal Description, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDI Implementation, UDDI with WSDL, UDDI specification, Service Addressing and Notification, Referencing and addressing Web Services, Web Services Notification.

UNIT - V

SOA and web services security considerations, Network-level security mechanisms, Application-level security topologies, XML security standards, Semantics and Web Services, The semantic interoperability problem, The role of metadata, Service metadata, Overview of .NET and J2EE, SOA and Web Service Management, Managing Distributed System, Enterprise management Framework, Standard distributed management frameworks, Web service management, Richer schema languages, WS-Metadata Exchange.

Text Books:

1. Web Services & SOA Principles and Technology, Second Edition, Michael P. Papazoglou.
2. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.
3. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education.

Reference Books:

1. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.
2. Building web Services with Java, 2nd Edition, S. Graham and others, Pearson Education.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.
4. McGovern, et al., "Java web Services Architecture", Morgan Kaufmann Publishers, 2005.
5. J2EE Wer Services, Richard Monson-Haefel, Pearson Education.

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III Year MCA **V Semester**

Dept. Elective-III
SIMULATION AND MODELING

Prerequisites
1. A course on "Computer Oriented Statistical Methods"

Objectives
1. The course is intended to provide a thorough understanding of methods, techniques and tools for modeling, simulation and performance analysis of complex systems
2. The topics include system models and studies; random number generation; simulation of continuous and discrete systems; simulation of queuing systems and pert networks.

Outcomes
1. Acquire proficiency in constructing a model for a given system/set of data.
2. Ability to generate and test random number variates and employ them in developing simulation models.
3. Ability to infer from the model and apply the results to resolve issues in a real world environment

Unit-I: System Models and Studies
System Models: Concepts of a System, System Environment, Stochastic Activities, Continuous and Discrete Systems, System Modeling, Types of Models, Static Physical Models, Dynamic Physical Models, Static Mathematical Models, Dynamic Mathematical Models, Principles Used in Modeling.
System Studies: Subsystems, A Corporate Model, Environment Segment, Production Segment, Management Segment, The Full Corporate Model, Types of System Study, System Analysis, System Design, System Postulation

Unit-II: Random Numbers
Random Number Generation: Properties, Generation of Pseudo-Random Numbers, Techniques of generating random numbers, tests for random numbers
Random-Variate Generation: Inverse-Transform Technique, Acceptance-Rejection Technique, Special Properties.

Unit-III: Simulation of Continuous and Discrete Systems
Simulation of Continuous Systems: A chemical reactor, Numerical integration vs. continuous system simulation, Selection of an integration formula, Runge-Kutta integration formulas, Simulation of a servo system, Simulation of a water reservoir system, Analog vs. digital simulation.
Discrete System Simulation: Fixed time-step vs. event-to-event model, On simulating randomness, Generation of random numbers, Generation of non-uniformly distributed random numbers, Monte-Carlo computation vs. stochastic simulation.

Unit-IV: System Simulation
Simulation of Queueing Systems: Rudiments of queueing theory, Simulation of a single-server queue, Simulation of a two-server queue, Simulation of more general queues.

Simulation of a Pert Network: Network model of a project, Analysis of activity network, Critical path computation, Uncertainties in activity durations, Simulation of activity network, Computer program for simulation, Resource allocation and cost considerations.

Unit-V: Simulation Experimentation
Design and Evaluation of Simulation Experiments: Length of simulation runs, Variance reduction techniques, Experimental layout, Validation.
Simulation Languages: Continuous and discrete simulation languages, Continuous simulation languages, Block-structured continuous simulation languages, Expression-based languages, Discrete-system simulation languages, GPSS.

Text Books

1. System Simulation, Geoffrey Gordon, Prentice-Hall of India Private Limited, Second Edition, 1978. (for Unit-I: Chapters 1 and 2)
2. Discrete-Event System Simulation, Jerry Banks, John S. Carson II, Barry L. Nelson, David M.Nicol, Pearson, Fifth Edition, 2010. (for Unit-II: Chapters 7 and 8)
3. System Simulation with Digital Computer, Narsingh Deo, Prentice-Hall of India Private Limited, 1979. (for Unit-III to V: Chapters 2 to 5 and 7,8).

Reference Books

1. System Modeling land Simuation: An Introduction, Frank L. Severance, Wiley Publisher, 2005

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JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year MCA **V Semester**

Dept. Elective-III
INFORMATION RETRIEVAL SYSTEMS

Prerequisites:
- Data Structures

Course Objectives:

- to learn the important concepts and algorithms in Inforamtion Retrieval Systems.
- To understand the data/file structures that are necessary to design, and implement Information Retrieval (IR) systems.

Oucomes :

- Can be able to use different information retrieval techniques in various application areas
- Can apply IR principles to locate relevant information in large collections of data
- Able to design different document clustering Algorithms.
- Can be able to implement retrieval systems for web search tasks.

UNIT I
Introduction:
Motivation, Basic Concepts, Past-Present and Future, the Retrieval Process
Modeling :
Introduction, A Taxonomy of Information retrieval Models, Retrieval: Ad hoc and Filtering, A Formal Characteristics of IR Models, Classic Information Retrieval, Alternative Ste Theory Models, Alternative Probabilistic Models, Structured Text Retrieval Models, Model for Browsing

UNIT II
Retrieval Evaluation
Introduction, retrieval Performance Evaluation, Reference Collections
Query languages
Introduction, Keyword-Based Querying, Pattern Matching, Structural Queries, Query Protocols
Query Operations
Introduction, User Relevance Feedback, Automatic Local Analysis, Automatic global Analysis
Text Operations
Introduction, Document Preprocessing, Document Clustering, Text Compression, Comparing text Compression Techniques

UNIT III
Indexing and Searching
Introduction, Inverted Files, Other Indices for Text, Boolean queries, Sequential Searching, pattern Matching, Structural Queries, Compression
Searching the Web
Introduction, Challenges, Characterizing the Web, Search Engines, Browsing, Metasearches, Finding the Needle in the Haystack, Searching using Hyperlinks

UNIT IV

User Interfaces and Visualization

Introduction, human-Computer Interaction, The Information Access Process, Starting Points, Query Specification, Context, User Relevance Judgments, Interface Support for the Search Process

UNIT V

Multimedia IR: Models and Languages

Introduction, Data Modeling, Query Languages

Multimedia IR: Indexing and |Searching

Introduction, Background-Spatial Access Methods,A Generic Multimedia Indexing Approach, One Dimentional Time Series, wo dimential Color Images, Automatic Feature Extraction.

Text Books

1. Modern Information Retrival By Yates and Neto Pearson Education.

Reference:

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
2. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
3. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.

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III Year MCA **V Semester**

INFORMATION SECURITY LAB

Prerequisites

- 1. A Course on "Computer Networks, Mathematics

Objectives

- To understand the fundamentals of Cryptography
- To understand the various key distribution and management schemes
- To apply algorithms used for secure transactions in real world applications

Outcomes

- Demonstrate the knowledge of cryptography and network security concepts and applications.
- Ability to implement different public and private key algorithms..
- Ability to implement the programs to demonstrate the vulnerabilities and security threats and mechanisms to counter them.

1. Write a program that can encrypt and decrypt using Ceaser Cipher.
   Assume the key value K = 5.
2. Write a program to encrypt and decrypt using a 2 X 2 Hill Cipher.
3. Write a program that can encrypt and decrypt using a transposition technique, key value k = 4312567.
4. Write a program that can encrypt and decrypt using simple DES.
5. Using any one of the key management technique, write a program so that the sender and the receiver have the same secret key (Symmetric key encryption).
6. Write an RSA program for generating the public and private key, and for encrypting and decrypting the given plain text.
7. Write a Diffie-Hellman key exchange program for generating the public and private key.

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III Year MCA **VI Semester**

TECHNICAL SEMINAR

Prerequisites

- None.

Objectives

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Outcomes

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

- Analyze the selected topic, organize the content and communicate to audience in an effective manner
- Practice the learning by self study

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III Year MCA **VI Semester**

Project Stage II

Prerequisites
- None.

Objectives
- To identify a problem, analyse, design and code
- To demonstrate with sufficient case studies

Outcomes
At the end of the course the student will be able to:
- Ability to Synthesize and apply prior knowledge to designing and implementing solutions to open-ended computational problems while considering multiple realistic constraints.
- Ability to design and develop the software with SE practices and standards
- Ability to analyze database, network and application design methods
- Ability to evaluate the various validation and verification methods
- Ability to practice CASE tools for solving case studies
- Ability to analyzing professional issues, including ethical, legal and security issues, related to computing projects.