

Andhra Pradesh, India

**ACADEMIC REGULATIONS  
COURSE STRUCTURE  
AND  
DETAILED SYLLABUS**

**COMPUTER SCIENCE &  
ENGINEERING**

*For*

**5 YEAR INTEGRATED  
DUAL DEGREE PROGRAM (I.D.P)**

**Leading to**

**(B.TECH. & M.Tech. / MBA )**

*(Applicable for the batches admitted from 2009-2010)*



**JNTUH COLLEGE OF ENGINEERING HYDERABAD  
(Autonomous)**

Kukatpally, Hyderabad – 500085



**JNTUH COLLEGE OF ENGINEERING HYDERABAD  
Kukatpally, Hyderabad -500085**

**ACADEMIC REGULATIONS FOR  
5 YEAR INTEGRATED DUAL DEGREE PROGRAM  
(B.Tech. & M.Tech. / MBA)  
(with effect from 2009-10 Academic Year)**

**1) 5 Year Integrated Dual Degree Program :**

JNTUH offers 5 Years (10 Semesters) Integrated Dual Degree Program (IDP) in the following Branches of Engineering, at its Constituent Autonomous College - JNTUH College of Engineering, Hyderabad, with effect from the Academic Year 2009 – 10 onwards.

S.No.	UG Program	PG Program	
		<i>M.Tech. (Specialization)</i>	<i>MBA (Specialization)*</i>
1)	B.Tech. in electronics & Communication Engineering	M.Tech. (Communications & Signal Processing)	MBA (Human Resources / Finance/Marketing/ Systems)
2)	B.Tech. in Computer Science & Engineering	M.Tech. (Computer Science)	MBA (Human Resources / Finance/Marketing/ Systems)
3)	B.Tech. in Electrical & Electronics Engineering	M.Tech. (Power Electronics)	MBA (Human Resources / Finance/Marketing/ Systems)
4)	B.Tech. in Mechanical Engineering	M.Tech. (Manufacturing Systems)	MBA (Human Resources / Finance/Marketing/System s)
5)	B.Tech. in Civil Engineering	M.Tech. (Structural Engineering)	MBA (Human Resources / Finance/Marketing/System s)

**(\* A Minimum of 15 students is necessary for any specialization to be offered.)**

A student would be conferred the B.Tech. Degree and M.Tech. or MBA Degree in this IDP, after the successful completion of all the requirements for the 10 Semesters of study and earning the appropriate credits.

**2) Eligibility of Admission :**

2.1 Admission to the IDP shall be made either on the basis of the merit rank obtained by the qualifying candidate at an Entrance Test conducted by the AP State Government (EAMCET), OR the University, OR on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the Government from time to time.

2.2 Students opting for the 5 year integrated IDP must specify their choice for M.Tech (with the specialization given above) or MBA as the case may be, after choosing the appropriate Branch of Engineering, at the time of Admissions only. Option thus exercised is final, and can not be changed during the study period.

2.3 Students opting for 5 years integrated IDP have to study for the specified period, to earn the relevant credits for the award of both the B.Tech and M.Tech / MBA Degrees, and they will not be permitted to have a choice for B.Tech. Degree alone after 4 years study.

**3) IDP Structure :**

3.1 The Dual Degree Program comprises of two parts – B.Tech. or UG Program and M.Tech./MBA or PG Program. The UG and PG Programs have the following groups or categories or components, which may include theory and lab. subjects as well

S.No.	UG/PG Program	Group/Category/Component	Description
1)	UG	BS – Basic Sciences	Includes - Mathematics, Physics and Chemistry Subjects
2)	UG	EAS - Engineering Arts and Sciences	Include fundamental engineering subjects
3)	UG	HSS – Humanities and Social Sciences	Includes subjects related to Humanities, Social Sciences and Management
4)	UG	DE – Departmental Electives	Includes Elective subjects related to the parent discipline, department or branch of engineering
5)	UG	DC – Departmental Core	Includes core subjects related to the parent discipline, department or branch of engineering
6)	UG	OE – Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the parent discipline, department or branch of engineering
7)	UG	Project	B.Tech. Project or UG Project or UG Major Project
8)	UG	Industrial Training/ Mini Project	Industrial Training/ Internship/ UG Mini Project/ Mini Project
9)	UG	Seminar	Seminar / Colloquium based on UG Industrial Training or Internship or Mini Project
10)	PG	PGC	PG Core Subjects related to the M.Tech. Specialization / MBA
11)	PG	PGE	PG Elective Subjects related to the M.Tech. Specialization / MBA
12)	PG	Project	PG Project or PG Major Project or Major Project in M.Tech. Specialization / MBA
13)	PG	Summer Internship	PG Summer Internship
14)	PG	Seminar	Seminar / Colloquium at PG level, in M.Tech. / MBA
15)	PG	Comprehensive Viva	Comprehensive Viva based on PG Subjects

3.2 In the IDP, each Subject, Lab., Project, Industrial Training/ Seminar/ Comprehensive Viva etc. - has specified credits, as indicated in the Course Structure. The credit requirements for IDP are : (i) at UG Level : 180 credits at B.Tech. level, plus (ii) at PG Level : 70 credits at M.Tech./MBA level.

3.3 The minimum instruction days for each Semester shall be 90 working days. In a Semester, one lecture hour per week is rated as one credit, and two tutorial or two practical hours per week may be rated as one credit in general.

3.4 There shall be no branch transfers at UG Level, and no changes of specializations at PG Level, after the completion of the First Admission Process.

3.5 The Course Structure and Curriculum for the first 3 years (6 Semesters) would be same as that for earning the Regular 4 Year B.Tech. Degree in the respective Branch of Engineering. The PG Project Work for the M.Tech. Degree shall commence from the beginning of the Summer (between IV Year and V Year) at the end of 8<sup>th</sup> Semester, and shall be carried out upto the end of the V Year II Semester. There shall be a Seminar (linked to PG Project) in the V Year I Semester, and a Comprehensive Viva-voce at the end of the V Year II Semester.

3.6 The IDP shall also have a compulsory Industrial Training/Mini Project for about 8 weeks, during the Summer between III Year and IV Year, and each student shall deliver a Seminar at their respective Departments, at the beginning of the IV Year I Semester. A separate Marks Memo shall be issued for Industrial Training / Mini Project and Seminar.

#### 4) Course Work :

4.1 A student after securing admission must pursue the 5 Year Integrated Dual Degree Program of study for a duration of 10 Semesters (or 5 years). Each Semester shall be of 22 weeks duration (inclusive of examinations), with 17 weeks of instruction days.

4.2 The student must secure a total of 250 credits for the IDP - 180 credits for the B.Tech. Degree Program, plus 70 credits for the M.Tech. or MBA Program, under different categories as indicated in Item 3.1.

4.3 The student should complete the IDP within a period equal to twice the prescribed duration of the Program, from the Date of Admission. Students, who fail to fulfil all the academic requirements for the award of the Dual Degrees within 10 academic years from the Date of Admission, shall forfeit their seat in both B.Tech. and M.Tech./MBA Courses.

#### 5) Attendance Requirements :

- 5.1 The student shall be eligible to appear for the Semester End Examinations, if he acquires a minimum of 75% attendance in aggregate of all the subjects put together in a Semester.
- 5.2 Condonation of shortage of attendance in aggregate upto 10% (net attendance of 65% and above, and below 75%) in each Semester may be granted by the College Academic Committee. Such condonation shall be granted only on genuine and valid reasons, on representation by the candidate with supporting evidence, and on payment of the stipulated condonation fee.
- 5.3 Shortage of attendance below 65% in aggregate shall NOT be condoned.
- 5.4 Students, whose shortage of attendance is not condoned in any Semester, are not eligible to take their End Examinations of that Semester, and their registration for that Semester shall stand cancelled.
- 5.5 A student shall not be promoted to the next Semester, unless he satisfies the attendance requirement of the present Semester. In such cases, the student may seek readmission for that Semester, as and when offered.

**6) Academic Requirements :**

The following academic requirements have to be satisfied, in addition to the attendance requirements specified in Item 5.

- 6.1(a) U.G. Part :** A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory subject / practical subject / design / drawing subject / Seminar / Industrial training / Mini Project / UG Project, if he secures not less than 35% of marks in the end examination, and a minimum of 40% marks in the sum total of the internal evaluation and end examination taken together.
- (b) P.G. Part :** A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory subject / practical subject / design / drawing subject / Seminar / Comprehensive Viva-voice, if he secures not less than 40% of marks in the end examination, and a minimum of 50% marks in the sum total of the internal evaluation and end examination taken together.
- 6.2 A student shall be **promoted from II to III year** only if he fulfils the academic requirements of earning **36 credits from two regular and one supplementary examinations of I year I semester, and One Regular & One Supplementary exam of I year II semester, and one regular examination of II year I semester** irrespective of whether the candidate takes the examination or not.

- 6.3 A student shall be **promoted from III year to IV year** only if he fulfils the academic requirements of earning total **64 credits from the following examinations**, whether the candidate takes the examinations or not.
- Three regular and Two supplementary examinations of I B Tech – I Semester.
  - Two regular and two Supplementary examinations of I B Tech II Semester
  - Two regular and one supplementary examinations of II year – I Semester.
  - One regular and one supplementary examinations of II year II semester.
  - One regular examination of III year I semester
- 6.4 A student shall be promoted from IV Year to V Year, only if he fulfils the academic requirements of earning 90 credits from the following examinations, whether he takes the examinations or not ~  
All possible regular and supplementary examinations upto (and inclusive of) IV Year I Semester, after the specified examinations listed in Item 6.3.  
In addition the student has to complete the UG Project satisfactorily and earn the prescribed number of credits for Project by the end of IV Year II Semester.
- 6.5 A student eligible to appear for the V Year end Semester examination in any Subject (Theory/ Lab.) or Seminar/ Comprehensive Viva/ Project etc., but absent at it or has failed in the end examination, may appear for the same at the supplementary examination or subsequent examination as and when offered.
- 6.6 (a) When a student is detained due to shortage of attendance in any semester, he may be re-admitted into that semester when it is next offered, **with the academic regulations of the batch into which he got readmitted.**
- (b) When a student is detained due to lack of credits in any year, he may be readmitted into the next year after fulfilment of the academic requirements, **with the academic regulations of the batch into which he got readmitted**
- 6.7 A student shall register for all the 250 credits as specified in the Course Structure and put up the minimum attendance requirements in all the Semesters, and earn all the 250 credits for the IDP. Marks obtained in all the specified 180 UG credits shall be considered for the calculation of percentage of marks for the B.Tech. Program, and the marks obtained in all the specified

70 PG credits shall be considered for the calculation of % of marks for the M.Tech./MBA Program.

6.8 Students, who fail to earn the 180 UG credits as indicated in the Course Structure, within 8 Academic Years from the Date of Admission, shall forfeit their seat in the IDP, and their admission for the entire Dual Degree Program shall stand cancelled.

6.9 Students, having secured the 180 UG credits, but fail to earn all the specified PG credits as indicated in the Course Structure, within 10 Academic Years from the Date of Admission, shall forfeit their seat in the PG program of IDP and their registration/continuation for the PG Degree Program shall stand cancelled.

#### 7) **Evaluation Procedure :**

The performance of a student shall be evaluated in each Semester Subject wise as follows

##### 7.1 For UG Part of the IDP

(i) Theory Subjects are evaluated for 100 marks, and Practicals/Lab. Subjects are evaluated for 75 marks.

(ii) Industrial Training/Mini Project and Seminar shall be evaluated for 50 marks each.

(iii) For theory subjects, the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination. For theory subjects, during the Semester there shall be 2 internal examinations, each of which shall be for 25 marks, which include - 1 objective type test of 20 minutes duration for 10 marks, and 1 subjective type test of 90 minutes duration for 15 marks. The objective type test and subjective test of each internal examination shall be conducted together in one sitting, and each shall cover 50% of that subject syllabus. Better one out of these two internals shall be considered for awarding the 25 sessional marks.

(iv) For practical subjects there shall be a continuous evaluation during the semester for **25 sessional marks and 50 end examination marks**. Out of the 25 marks for internal, **day-to-day work in the laboratory shall be evaluated for 15 marks**, and **two internal examinations for practical each of 10 marks** shall be conducted by the concerned laboratory teachers. The **better of two** internal exams shall be considered. The End Examination shall be conducted by the teacher concerned and another faculty member of the same Department, as suggested by the Head of Dept.

(v) For the Subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing

and Estimation etc.), the distribution shall be 25 marks for internal evaluation (10 marks for day-to-day work and 15 marks for internal tests) and 75 marks for end examination. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of the 15 marks for internal tests.

(vi) There shall be an Industrial Training or Mini Project, preferably in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester End Examinations. The Training/Mini Project and its Report shall be evaluated at the beginning of the IV Year I Semester. The Training Activity/ Mini Project shall be submitted in a Report form, and the student shall also deliver a Seminar (based on the Training Activity/Mini Project) before the Project Review/Evaluation Committee (PRC); both the report and the Seminar shall be evaluated for 50 marks each by the PRC. The PRC shall be constituted by the Head of Dept., and shall consist of the Head of the Department, the Supervisor of Industrial Training/Mini Project/Seminar/UG Project / PG Project, and a Senior Faculty Member of the Department. There shall be no internal marks for this Industrial Training/Mini Project.

(vii) The UG Project shall be evaluated for 200 marks, out of which 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Viva-Voce Examination. The topics for Mini Project and Project Work shall be different from each other. The Viva-voce examination shall be conducted by the same PRC. The Internal Evaluation shall be based on the assessment of the student performance through out the Project Work by his Project Supervisor, and the related marks (50 marks) shall be awarded by the Project Supervisor.

##### 7.2 For M.Tech. (PG) Part of the IDP ~

(i) Theory Subjects are evaluated for 100 marks, and Practicals/Lab. Subjects are also evaluated for 100 marks.

(ii) Seminar and Comprehensive Viva-voce shall be evaluated for 50 marks each.

(iii) For theory subjects, the distribution shall be 40 marks for Internal Evaluation and 60 marks for the End-Examination. For the award of the 40 Internal (sessional) marks for theory subjects, there shall be 2 internal examinations during the Semester, one at the middle of the Semester and the other immediately after the completion of instruction; each of which shall be evaluated for 25 marks, and the better one out of these two internals shall be considered for awarding the 25 sessional marks. Out of the remaining 15 sessional marks, 5 marks are

allocated for teacher's assessment (allotment is based on performance of the student in the class) and 10 marks will be awarded based on the student's performance in the Assignments.

- (iv) For Practicals/Lab. subjects, there shall be a continuous evaluation during the Semester for 40 sessional marks and 60 End Examination marks. Of these 40 marks, 15 marks shall be awarded for day-to-day work and 25 marks to be awarded by conducting an internal laboratory test. The End Examination shall be conducted by the teacher concerned and another faculty member of the same Department, as suggested by the Head of Dept.
- (v) There shall be a Seminar presentation in the V year I Semester, for the award of 50 marks. The Seminar shall be on the topic chosen for PG Project/Dissertation Work; and the assessment will be done by the same PRC as constituted above.
- (vi) Every candidate of IDP shall be required to execute his M.Tech. Project (PG Project) and submit his Dissertation, after taking up a topic approved by the PRC. The PG Project shall start immediately after the completion of the IV Year II Semester (Summer between IV Year and V Year), and shall be of one year duration. The student has to decide his topic for his M.Tech. Project Work within the first 6 weeks of this summer, and should submit his PG Project Work Proposal to the PRC, on whose approval he can register for the PG Project. The PRC will monitor the progress of the project work through two Seminar presentations - one during V Year I Semester [as specified in Item 7.2 (v)], and one before the submission of the PG Project/Dissertation. The student shall submit a Project Report at the end of the V year I Semester, and the same shall be evaluated at the end of that semester by the PRC as SATISFACTORY or UNSATISFACTORY. In the case of Unsatisfactory declaration, the student shall resubmit the Project report after carrying out the necessary modifications / additions in the Project work, within the specified time as suggested by the PRC. The student can submit the Dissertation, only after completion of 40 weeks from the Date of Registration, after obtaining the approval from PRC. Extension of time, within the total permissible limit for the completion of the IDP, may be considered by the PRC, on sufficient valid/genuine grounds.
- (vii) The student shall be allowed to submit the PG Project Work and Dissertation, only on the successful completion of all the prescribed UG and PG Subjects (Theory and Lab.), Seminars, Industrial Training/Mini Project, UG Project, Comprehensive Viva, PG Project Stage-I etc. Once the student's PG Project

Work and Dissertation are approved by the PRC, the Dissertation will be sent to an External Examiner nominated by the Principal/Director of the College/School, on whose approval, the student can appear for the PG Project Viva-voce Examination.

- (viii) The PG Project Work and Dissertation will be adjudicated by One External Examiner selected by the competent authority. If the report of the External Examiner is favourable, then Viva-voce Examination shall be conducted by a Board, consisting of the PG Project Supervisor, Head of Dept., and the External Examiner who adjudicated the Project Work and Dissertation. The Board shall jointly report the student's performance in the PG Project Work as - (A) EXCELLENT, or (B) GOOD, or (C) SATISFACTORY, or (D) UNSATISFACTORY, as the case may be. In case, the student fails in the Viva-voce Exam., or gets the UNSATISFACTORY grade, he has to reappear for the Viva-voce Exam., as per the recommendations of the Board. If he fails at the second Viva-voce Exam. also, he will not be eligible for the award of the Degree, unless he is asked to revise and resubmit by the Board.
  - (ix) If the report of the External Examiner is not favorable, the student shall revise and resubmit the Dissertation after one semester or as per the time specified by the External Examiner and/or the PRC. If the report of the Examiner is unfavourable again, then the Dissertation will be summarily rejected. In such a case, the dissertation shall be modified and resubmitted within the specified time, as per the suggestions and recommendations of the External Examiner / PRC.
  - (x) There shall be a Comprehensive Viva-Voce at the end of the V year II Semester, for the award of 50 marks. The Comprehensive Viva-Voce shall be conducted by the PRC, with the addition of one more Senior Faculty Member of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects studied during the Dual Degree Program. There are no internal marks for the Comprehensive Viva-voce.
- 7.3 **For M.B.A. (PG) Part of the IDP**
- (i) Theory Subjects are evaluated for 100 marks, and Practicals/Lab. Subjects are also evaluated for 100 marks.
  - (ii) PG Summer Internship, Seminar and Comprehensive Viva-voce shall be evaluated for 50 marks each.
  - (iii) There shall be a PG Summer Internship, preferably in an industry, to be taken up during the vacation, immediately after

the IV year II Semester End Examinations. The Internship Activity shall be submitted in a Report form, and the student shall also deliver a Seminar (based on the PG Summer Internship) before the MBA Project Evaluation Committee (PEC); both the Report and the Seminar shall be evaluated for 50 marks each by the PEC, at the beginning of the V Year I Semester. The PEC shall be constituted by the Head of Dept. or Principal/Director of the College/School, and shall consist of the Head of the Department, the Supervisor of PG Summer Internship Program/Seminar/PG Project and a Senior Faculty Member of the Department. There shall be no internal marks for this PG Summer Internship Program.

- (iv) For theory subjects, the distribution shall be 40 marks for Internal Evaluation and 60 marks for the End-Examination. For the award of the 40 Internal (sessional) marks for theory subjects, there shall be 2 internal examinations during the Semester, one at the middle of the Semester and the other immediately after the completion of instructions; each of which shall be evaluated for 25 marks, and the **better** of these two internals shall be considered for awarding the 25 sessional marks. Out of the remaining 15 sessional marks, 5 marks are allocated for teacher's assessment (allotment is based on the performance of the student in the class) and 10 marks will be awarded based on the student's performance in the Assignments.
- (v) Every candidate of IDP shall be required to execute his MBA Project (PG Project) and submit his Dissertation, after taking up a topic approved by the PEC. The PG Project shall start immediately after the completion of the V Year I Semester, and shall be of one Semester duration. The student has to decide his topic for his MBA Project Work within the first 2 weeks of V year II Semester and should submit his PG Project Proposal to the PEC, on whose approval he can register for the PG Project. The PEC will monitor the progress of the Project Work through a Seminar Presentation before the submission of the PG Project/Dissertation. The student can submit the Dissertation only after completion of 16 weeks from the Date of Registration of the PG Project Work, after obtaining the approval from PEC, which will be based on satisfactory performance of the student in the seminar presentation. Extension of time, within the total permissible limit for the completion of the IDP, may be considered by the PEC, on sufficient valid/genuine grounds.
- (vi) The student shall be allowed to submit the PG Project Work and Dissertation, only on the successful completion of all the prescribed UG and PG Subjects (Theory and Lab.), Industrial Training/Mini Project, UG Project, Summer Internship,

Seminars, Comprehensive Viva-Voce, etc. Once the student's PG Project Work and Dissertation are approved by the PEC, the Dissertation will be sent to an External Examiner nominated by the Principal/ Director of the College/School, on whose approval, the student can appear for the PG Project Viva-voce Examination.

- (vii) The PG Project Work and Dissertation will be adjudicated by One External Examiner selected by the competent authority. If the report of the External Examiner is favourable, then Viva-voce Examination shall be conducted by a Board, consisting of the PG Project Supervisor, Head of Dept., and the External Examiner who adjudicated the Project Work and Dissertation. The Board shall jointly report the student's performance in the PG Project Work as - (A) EXCELLENT, or (B) GOOD, or (C) SATISFACTORY, or (D) UNSATISFACTORY, as the case may be. In case, the student fails in the Viva-voce Exam., or gets the UNSATISFACTORY grade, he has to reappear for the Viva-voce Exam., as per the recommendations of the Board. If he fails at the second Viva-voce Exam. also, he will not be eligible for the award of the Degree, unless he is asked to revise and resubmit by the Board.
- (viii) If the report of the External Examiner is not favorable, the student shall revise and resubmit the Dissertation after one semester or as per the time specified by the External Examiner and/or the PEC. If the report of the Examiner is unfavourable again, then the Dissertation will be summarily rejected. In such a case, the dissertation shall be modified and resubmitted within the specified time, as per the suggestions and recommendations of the External Examiner / PEC.
- (ix) There shall be a Comprehensive Viva-Voce at the end of the V year II Semester, for the award of 50 marks. The Comprehensive Viva-Voce shall be conducted by the PEC, with the addition of one more Senior Faculty Member of the Department/School. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects studied during the PG part of Dual Degree Program. There are no internal marks for the Comprehensive Viva-voce.

#### **7.4 Grading Procedure (Common for M.Tech. & MBA)**

- (i) Marks will be awarded to indicate the performance of each student in each Theory Subject or Practicals or Seminar or UG Project or Comprehensive Viva-voce etc., as specified above in Items 7.1, 7.2 and 7.3, and a proportional letter grade shall be given.

- (ii) As a measure of the student's performance, a Grading System using the following letter grades and corresponding percentage of marks shall be followed.

**For UG :**

<i>% of Marks Secured</i>	<i>Letter Grade</i>
70% and above	A
Below 70% but not less than 60%	B
Below 60% but not less than 50%	C
Below 50% but not less than 40%	D
Below 40%	F

**For PG :**

<i>% of Marks Secured</i>	<i>Letter Grade</i>
70% and above	A
Below 70% but not less than 60%	B
Below 60% but not less than 50%	C
Below 50%	F

**8) Award of Degree or Class :**

After a student satisfies all the requirements prescribed for the completion of the IDP and becomes eligible for the award of the respective Degree, he shall be placed in one of the following four classes

**For UG :**

<i>Class Awarded in UG Program</i>	<i>% of Marks Secured</i>	<i>Program Credits</i>
FIRST CLASS with DISTINCTION	70% and above	From the Aggregate secured for the 180 UG credits.
FIRST CLASS	Below 70% but not less than 60%	
SECOND CLASS	Below 60% but not less than 50%	
PASS CLASS	Below 50% but not less than 40%	

**For PG**

<i>Class Awarded in PG Program</i>	<i>% of Marks Secured</i>	<i>Program Credits</i>
FIRST CLASS with DISTINCTION	70% and above	From the Aggregate secured for the 70 PG credits.
FIRST CLASS	Below 70% but not less than 60%	
SECOND CLASS	Below 60% but not less than 50%	
FAIL	Below 50%	

**9) Withholding of Results :**

If the student has not paid dues to University/College, or if any case of indiscipline is pending against him, the result of the candidate 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.

**10) Transitory Regulations :**

Students who have discontinued or have been detained for want of attendance, or who have failed after having undergone the IDP, may be considered eligible for readmission to the same or equivalent subjects as and when they are offered, subject to Item 6.8 and 6.9.

**11) General :**

- 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' and 'Practical Subject' or 'Lab'.
- In case of any ambiguity or doubt in the interpretations of the above regulations, the decision of the Vice-Chancellor will be final.
- There shall be no branch transfers, no place transfers, no course transfers, and no transfers from 5 year IDP to 4 year B.Tech (Regular) degree programme (Of same branch



or any other branch) or Vice versa, after the completion of the admission process.

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**JNTUH COLLEGE OF ENGINEERING HYDERABAD  
(AUTONOMOUS)  
5 Year Integrated Dual Degree Program (IDP)  
(B.Tech. + M.Tech. / MBA)**

**COMPUTER SCIENCE & ENGINEERING  
COURSE STRUCTURE**

**I YEAR I SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	BS	Mathematics - I	3	1	0	3
2	EAS	Computer Programming & Data Structures	3	1	0	3
3	HSS	English	3	0	0	3
4	EAS	Engineering Graphics	2	0	4	4
5	EAS	Engineering Mechanics	3	1	0	3
6	EAS	Computer Programming & Data Structures Lab	0	0	3	2
7	HSS	English Language Communication Skills Lab	0	0	3	2
8	EAS	IT Workshop & Engineering Workshop	0	0	3	2
		NSS / NCC				
						<b>22</b>

**I YEAR II SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	BS	Mathematics– II	3	1	0	3
2	BS	Mathematics – III	3	1	0	3
3	EAS	Basic Electrical & Electronics Engineering	3	1	0	3
4	BS	Engineering Chemistry	3	0	0	3
5	BS	Applied Physics	3	1	0	3
6	EAS	Environmental Science	3	0	0	3
7	EAS	Basic Electrical & Electronics Lab	0	0	3	2
8	BS	Applied Physics Lab	0	0	3	2
		NSS/NCC				

						<b>22</b>
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**JNTUH COLLEGE OF ENGINEERING HYDERABAD  
(AUTONOMOUS)  
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(B.Tech. + M.Tech. / MBA)**

**COMPUTER SCIENCE & ENGINEERING  
COURSE STRUCTURE**

**II YEAR I SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	HSS	Managerial Economics and Financial Analysis	4	0	0	4
2	BS	Probability & Statistics	4	0	0	4
3	EAS	Digital Logic Design	3	1	0	4
4	DC	Advanced Data Structures	3	1	0	4
5	DC	Mathematical Foundations of Computer Science	3	1	0	4
6	DC	Object Oriented Programming through JAVA	3	1	0	4
7	DC	Internet Technologies lab	0	0	3	2
8	DC	Advanced Data Structures Lab	0	0	3	2
						<b>28</b>

**II YEAR II SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	DC	Computer Organization & Microprocessor	3	1	0	4
2	DC	Data Base Management Systems	3	1	0	4
3	DC	Principles of Programming Languages	3	1	0	4
4	HSS	Management Science	4	0	0	4
5	DC	Formal Languages and Automata Theory	3	1	0	4
6	DC	Design and Analysis of Algorithms	4	0	0	4
7	DC	Computer Organization & Microprocessor lab	0	0	3	2
8	DC	Data Base Management	0	0	3	2

		Systems Lab				
						28

**JNTUH COLLEGE OF ENGINEERING HYDERABAD  
(AUTONOMOUS)  
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(B.Tech. + M.Tech. / MBA)**

**COMPUTER SCIENCE & ENGINEERING  
COURSE STRUCTURE**

III YEAR			I SEMESTER			
S.No.	Group	Subject	L	T	P	Credits
1	DE-1	Departmental Elective –I	4	0	0	4
2	DC	Compiler Design	4	0	0	4
3	OE-1	OPEN ELECTIVE – 1	4	0	0	4
4	DC	Software Engineering	4	0	0	4
5	DC	Operating Systems	4	0	0	4
6	DC	Data Communications & Computer Networks	4	0	0	4
7	DC	Compiler Design & Computer Networks Lab	0	0	3	2
8	DC	Operating Systems & Linux Internals Lab	0	0	3	2
						28

III YEAR			II SEMESTER			
S.No.	Group	Subject	L	T	P	Credits
1	DC	Object Oriented Analysis and Design	4	0	0	4
2	DE-2	Departmental Elective 2	4	0	0	4
3	DC	Network Security	4	0	0	4
4	DE-3	Departmental Elective 3	4	0	0	4
5	DC	Web Technologies	4	0	0	4
6	OE-2	OPEN ELECTIVE-2	4	0	0	4
7	DC	Web Technologies Lab	0	0	3	2
8	DC	Object Oriented Analysis and Design Lab	0	0	3	2
						28

Summer between III & IV Year : Industrial Training / Mini Project : 2 c  
Seminar : 2 c

S.No.	Subject	Credits
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1	Industrial Training / Mini Project	2
2	Seminar	2

**JNTUH COLLEGE OF ENGINEERING HYDERABAD  
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**COMPUTER SCIENCE & ENGINEERING  
COURSE STRUCTURE**

IV YEAR			I SEMESTER			
S.No.	Group	Subject	L	T	P	Credits
1	DE-4	Departmental Elective-4	4	0	0	4
2	PGC-1	Distributed Systems	3	1	0	3
3	PGE-1	PG Elective – 1	3	1	0	3
4	PGC-2	Software Architecture and Design Patterns	3	1	0	3
5	PGC-3	Advanced Algorithms	3	1	0	3
6	PGC	Advanced Algorithms Lab	0	0	4	2
7	HSS	Advanced English Language Communication Skills Lab	0	0	3	2
						20

IV YEAR			II SEMESTER			
S.No.	Group	Subject	L	T	P	Credits
1	DC	UG Project				14
2	PGC-4	Networking Programming	3	1	0	3
3	PGE-2	PG Elective – 2	3	1	0	3
4	PGE-3	PG Elective – 3	3	1	0	3
5	PGC	Network Programming Lab	0	0	4	2
						25

Summer between IV & V Year: PG Project Starts

**JNTUH COLLEGE OF ENGINEERING HYDERABAD  
(AUTONOMOUS)  
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**COMPUTER SCIENCE & ENGINEERING  
COURSE STRUCTURE**

V YEAR		I SEMESTER				
S.No.	Group	Subject	L	T	P	Credits
1	PGE-4	PG Elective 4	3	1	0	3
2	PGE-5	PG Elective 5	3	1	0	3
3	PGC-5	High Performance Computing	3	1	0	3
4	PGC	PG Project - Stage I				12
5	PGE	Seminar	0	0	3	2
						<b>23</b>

V YEAR		II SEMESTER				
S.No.	Group	Subject	L	T	P	Credits
1	PGC	PG Project (Stage-II)	0	0	0	20
2	PGE	Comprehensive viva-voce	0	0	0	2
						<b>22</b>

**Departmental Elective-1**

1. Advanced Computer Architectures
2. Advanced Database
3. Embedded Systems

**Departmental Elective-2**

1. Mobile Computing
2. Distributed computing
3. Parallel programming
4. Software Testing Methodologies

**Departmental Elective-3**

1. Artificial Intelligence
2. Computer Graphics
3. Network Management Systems

4. Multimedia Application Development

**Departmental Elective-4**

1. Web services & Service oriented Architecture
2. Bio-Informatics
3. Information Retrieval Systems
4. Natural Language Processing

**Open Elective-1**

1. Optimization Techniques
2. Number Theory
3. Intellectual Property Rights & Cyber Laws

**Open Elective-2**

1. Research Methodologies
2. Digital Signal Processing
3. VLSI
4. Professional Ethics

**PG Elective – 1**

1. High Speed Networks
2. Neural Networks
3. Semantic Web

**PG Elective – 2**

1. Internetworking with TCP/IP
2. Pattern Recognition
3. Game Theory

**PG Elective – 3**

1. Wireless Networks
2. Image Processing
3. Soft Computing

**PG Elective – 4**

1. Internet Protocols
2. Simulation and Modelling
3. Scripting Languages

**PG Elective – 5**

1. Cloud Computing
2. Ethical Hacking
3. Pervasive Computing

PG summer internship Seminar -2 Credits

**JNTUH COLLEGE OF ENGINEERING HYDERABAD  
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5 Year Integrated Dual Degree Program (IDP)  
(B.Tech. + M.Tech. / MBA)**

**COMPUTER SCIENCE & ENGINEERING  
COURSE STRUCTURE FOR MBA**

IV YEAR		I SEMESTER				
S.No.	Group	Subject	L	T	P	Credits
1	DE-4	Department Elective	4	0	0	4
2	PGC-1	PG Core – 1 Research Methodology and Statistical Analysis	3	0	0	3
3	PGC-2	PG Core – 2 Marketing Management	3	0	0	3
4	PGC-3	PG Core - 3 Business Environment	3	0	0	3
5	PGC -4	PG Core -4 Business Law and Regulation	3	0	0	3
6	PGC -5	PG Core -5 Human Resource Management	3	0	0	3
7	HSS	Adv. ELCS Lab.	0	0	3	2
						<b>21</b>

**IV YEAR II SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	DC	UG Project				14
2	PGC-6	PG Core – 6 Financial Management	3	0	0	3
3	PGC-7	PG Core – 7 Quantitative Analysis for Business Decisions	3	0	0	3
4	PGC -8	PG Core – 8 Production and Operations Management	3	0	0	3
						<b>23</b>

Between IV and V year PG summer internship – 2 Credits

**JNTUH COLLEGE OF ENGINEERING HYDERABAD  
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5 Year Integrated Dual Degree Program (IDP)  
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**COMPUTER SCIENCE & ENGINEERING  
COURSE STRUCTURE FOR MBA**

V YEAR		I SEMESTER				
S.No.	Group	Subject	L	T	P	Credits
1	PGC-9	PG Core – 9 Supply Chain Management	3	0	0	3
2	PGC 10	PG Core – 10 Cost and Management Accounting	3	0	0	3
3	PGC 11	PG Core – 11 Organizational Behaviour	3	0	0	3
4	PGE-1	PG Elective – 1 (Electives Listed Below)	3	0	0	3
5	PGE-2	PG Elective – 2 (Electives Listed Below)	3	0	0	3
6	PGE-3	PG Elective – 3 (Electives Listed Below)	3	0	0	3
						<b>18</b>

**V YEAR II SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	PGC-13	PG Core – 13 Strategic Management	3	0	0	3
2	PGE-4	PG Elective – 4 (Electives Listed Below)	3	0	0	3
3	PGE-5	PG Elective – 5 (Electives Listed Below)	3	0	0	3
4	PGE-6	PG Elective – 6 (Electives Listed Below)	3	0	0	3
5		PG Project				10
6		Comprehensive Viva				2
						<b>24</b>

## PG ELECTIVES

### Elective 1

- 1 Security Analysis and Portfolio Management
- 2 Business Intelligence
- 3 Marketing Communications
- 4 Management of Industrial Relations

### Elective 2

- 1 Derivatives
- 2 Information system, control and Audit
- 3 International Marketing
- 4 Performance Management

### Elective 3

- 1 Strategic Investment and Financing Decisions
- 2 Decision support systems
- 3 Sales and Distribution Management
- 4 Management of Change

### Elective 4

- 1 International Financial Management
- 2 Total Quality Management
- 3 Key Accounts Management
- 4 Training and Development

### Elective 5

- 1 Predictive Analytics
- 2 Management Information systems
- 3 Retailing Management
- 4 Compensation Management

### Elective 6

- 1 Financial Modeling
- 2 Project Management
- 3 Rural Marketing
- 4 Entrepreneurship and Good Governance

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem L T P C  
3 1 0 3

### MATHEMATICS-I (Common for all Branches)

**UNIT-I: Matrices:** Rank-Echelon form, Normal form – Solution of Linear Systems – LU Decomposition- Eigen values, eigen vectors – properties – Condition number, Cayley-Hamilton Theorem (without Proof) and applications– Diagonalization of a matrix. Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary – Eigen values and eigen vectors of complex matrices and their properties. Quadratic forms- Reduction of quadratic form to canonical form.

**UNIT-II: Functions of single variable and Curve tracing:** Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem (all theorems without proof) Functions - Radius, Centre and Circle of Curvature – Evolutes and Envelopes Curve tracing – Cartesian , polar and Parametric curves.

**UNIT-III: Functions of several variables :** Functions of several variables – Functional dependence- Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints.

**UNIT-IV: Applications of Integration:** Riemann Sums , Integral Representation for lengths, Areas, Volumes and Surface areas in Cartesian and polar coordinates multiple integrals - double and triple integrals – change of order of integration- change of variable

**UNIT-V: Vector calculus:** Vector Calculus: Gradient- Divergence- Curl and their related properties Potential function - Laplacian and second order operators. Line integral – work done – Surface integrals - Flux of a vector valued function. Vector integrals theorems: Green's -Stoke's and Gauss's Divergence Theorems (Statement & their Verification) .

**Text Books:**

1. A text Book of KREYSZIG'S Engineering Mathematics, Vol-1  
Dr .A. Ramakrishna Prasad. WILEY publications.
2. Higher Engineering Mathematics -I Shahnaz Bathul, Cengage learning.
3. Engineering Mathematics I – T.K.V. Iyengar, B. Krishna Gandhi & others, S. Chand.

**References:**

1. Early transcendental and its applications by James Stewart Thomson
2. Advanced Engineering mathematics ,Greenberg, Person Education
3. Advanced Engineering Mathematics, Third Edition, Merle C. Potter, J.L. Golberg, Edward F. Aboufadel
4. Higher Engineering mathematics – B.S. Grewal
5. Higher Engineering mathematics – B.V. Ramana, TMH

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**I Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem L T P C**  
**3 1 0 3**

**COMPUTER PROGRAMMING & DATA STRUCTURES****UNIT - I**

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

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

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

**UNIT - II**

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

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C programme examples.

**UNIT - III**

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.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C programme examples.

**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 programme examples.

#### UNIT – V

Searching and Sorting – Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, Searching-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 application-infix to postfix conversion, postfix expression evaluation, recursion implementation, 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.

#### REFERENCES :

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education
3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
5. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition
6. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
7. C Programming & Data Structures,E.Balagurusamy,TMH.
8. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
9. C& Data structures – E V Prasad and N B Venkateswarlu, S.Chand&Co.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem L T P C  
3 0 0 3

### ENGLISH

#### 1. INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure by the students. Hence, it is suggested that they read it on their own with topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. *However, the stress in this syllabus is on skill development and practice of language skills.*

#### 2. OBJECTIVES:

- a. To improve the language proficiency of the students in English with emphasis on LSRW skills.
- b. To equip the students to study academic subjects with greater facility through the theoretical and practical components of the English syllabus.
- c. To develop the study skills and communication skills in formal and informal situations.

### 3. SYLLABUS:

#### Listening Skills:

##### Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that can comprehend the speech of people of different backgrounds and regions

*Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.*

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

#### Speaking Skills:

##### Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: *Learning English : A Communicative Approach.*)
- Just A Minute(JAM) Sessions.

#### Reading Skills:

##### Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
  2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
- Skimming the text
  - Understanding the gist of an argument
  - Identifying the topic sentence

- Inferring lexical and contextual meaning
- Understanding discourse features
- Recognizing coherence/sequencing of sentences

**NOTE :** *The students will be trained in reading skills using the prescribed text for detailed study.*

*They will be examined in reading and answering questions using 'unseen' passages which may be taken from the non-detailed text or other authentic texts, such as magazines/newspaper articles.*

#### Writing Skills :

##### Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Editing a passage

### 4. TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into **Eight Units**, are prescribed:

#### *For Detailed study*

##### **1 One Text to be Prescribed**

#### *For Non-detailed study*

##### **1. One text to be Prescribed**

#### A. STUDY MATERIAL:

##### Unit –I

1. 1 Chapter from Text I
2. 1 Chapter from Text II



Unit –II

3. 1 Chapter from Text I

4. 1 Chapter from Text II

Unit –III

5. 1 Chapter from Text I

6. 1 Chapter from Text II

Unit –IV

7. 1 Chapter from Text I

8. 1 Chapter from Text II

\* Exercises from the lessons not prescribed shall also be used for classroom tasks.

Unit –V

**Exercises on**

Reading and Writing Skills

Reading Comprehension

Situational dialogues

Letter writing

Essay writing

**Practice Exercises on Remedial Grammar covering**

Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions,

Tense and aspect

**Vocabulary development covering**

Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

8. Everyday Dialogues in English, **Robert J. Dixson, Prentice Hall India Pvt Ltd.,**
9. ABC of Common Errors **Nigel D Turton, Mac Millan Publishers.**
10. Basic Vocabulary **Edgar Thorpe & Showick Thorpe, Pearson Education**
11. Effective Technical Communication, **M Ashraf Rizvi, Tata Mc Graw –Hill.**
12. An Interactive Grammar of Modern English, **Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO**
13. A Communicative Grammar of English, **Geoffrey Leech, Jan Svartvik, Pearson Education**
14. Enrich your English, **Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,**
15. A Grammar Book for You And I, **C. Edward Good, MacMillan Publishers.**

**REFERENCES :**

1. English Grammar Practice, **Raj N Bakshi, Orient Longman.**
2. Handbook of English Grammar & Usage, **Mark Lester and Larry Beason, Tata Mc Graw –Hill.**
3. Spoken English, **R.K. Bansal & JB Harrison, Orient Longman.**
4. Technical Communication, **Meenakshi Raman, Oxford University Press**
5. Objective English **Edgar Thorpe & Showick Thorpe, Pearson Education**
6. Grammar Games, **Renuvolcuri Mario, Cambridge University Press.**
7. Murphy's English Grammar with CD, **Murphy, Cambridge University Press.**

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**I Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem**

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<b>2</b>	<b>0</b>	<b>4</b>	<b>4</b>

**ENGINEERING GRAPHICS**

**Pre-requisite:** Nil

**Objective:** The objective of this subject is to provide the basic concepts about Engineering Drawing. Detailed concepts are given in projections, technical drawing, dimensioning and specifications.

**Codes / Tables:** Nil

**Question Paper Pattern:**

5 Questions to be answered out of 8 questions.  
Each question should not have more than 3 bits.

**UNIT – I**

**INTRODUCTION TO ENGINEERING DRAWING :**

Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Involute. Scales – Plain, Diagonal and Vernier Scales.

**UNIT- II**

**ORTHOGRAPHIC PROJECTIONS:**

Principles of Orthographic Projections – Conventions – Projections of Points and Lines  
Projections of Plane regular geometric figures.—Auxiliary Planes.

**UNIT – III**

Projections of Regular Solids – Auxiliary Views.

**UNIT – IV**

Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere.

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone

**UNIT – V**

**ISOMETRIC PROJECTIONS :**

Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.  
Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

**TEXT BOOKS :**

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing and Graphics Rane and Shah/  
Pearson Edu.

**REFERENCE BOOKS:**

1. A Text Book of Engineering Drawing / Dhawan R K / S. Chand
2. Engineering Graphics With Auto CAD / James D Bethune /  
Pearson Edu.
3. Engineering Graphics / K R Mohan / Dhanpat Rai.
4. Text book on Engineering Drawing / KL Narayana/ P Kannaih /  
Scitech

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem L T P C  
3 1 0 3

## ENGINEERING MECHANICS

## UNIT – I

**Introduction to Mechanics** : Basic Concepts, system of Forces Coplanar Concurrent Forces -Components in Space -Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems

## UNIT-II

**Friction**: Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions -Motion of Bodies -Wedge Screw, Screw-jack and differential screw –jack

## UNIT – III

**Centroid and Center of Gravity**: Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity of Bodies – Centroids of Volumes – Center of gravity of composite bodies.

## UNIT-IV

**Area moments of Inertia**: Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration - Transfer Theorem for moment of inertia – Moments of inertia by integration - Moments of Inertia of Composite Figures, Product of Inertia, Transfer Formula for Product of Inertia.

## UNIT – V

**Mass Moment of Inertia**: Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - Mass moment of inertia of composite bodies

## TEXT BOOKS:

Engineering Mechanics by Ferdinand L. Singer

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem L T P C  
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## COMPUTER PROGRAMMING &amp; DATA STRUCTURES LAB

## Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

## Task: 1.

**a)** Write a C program to find the sum of individual digits of a positive integer.

**b)** A 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.

**c)** Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

## Task: 2.

**a)** Write a C program to calculate the following Sum:  
Sum= $1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

**b)** Write a C program to find the roots of a quadratic equation.

## Task: 3

- a)** Write C programs that use both recursive and non-recursive functions
- To find the factorial of a given integer.
  - To find the GCD (greatest common divisor) of two given integers.
  - To solve Towers of Hanoi problem.

## Task: 4

**a)** The total distance travelled by vehicle in 't' seconds is given by distance =  $ut+1/2at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

**b)** 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)

**Task: 5**

**a)** Write a C program to find both the largest and smallest number in a list of integers.

**b)** Write a C program that uses functions to perform the following:

- i) Addition of Two Matrices
- ii) Multiplication of Two Matrices

**Task: 6**

**a)** 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.

**b)** Write a C program to determine if the given string is a palindrome or not

**Task: 7**

**a)** 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.

**b)** Write a C program to count the lines, words and characters in a given text.

**Task: 8**

**a)** Write a C program to generate Pascal's triangle.

**b)** Write a C program to construct a pyramid of numbers.

**Task: 9**

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots\dots\dots+x^n$$

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.

**Task: 10**

**a)** 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.

**b)** Write a C program to convert a Roman numeral to its decimal equivalent.

**Task: 11**

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.)

**Task: 12**

**a)** Write a C program which copies one file to another.

**b)** 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.)

**Task: 13**

**a)** Write a C programme to display the contents of a file.

**b)** Write a C programme 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)

**Task: 14**

Write a C program that uses functions to perform the following operations on singly linked list.:

- i) Creation ii) Insertion iii) Deletion iv) Traversal

**Task: 15**

Write C programs that implement stack (its operations) using

- i) Arrays ii) Pointers

**Task: 16**

Write C programs that implement Queue (its operations) using

- i) Arrays ii) Pointers

**Task: 17**

Write a C program that uses Stack operations to perform the following:

- i) Converting infix expression into postfix expression
- ii) Evaluating the postfix expression

**Task: 18**

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

**Task: 19**

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

**Task: 20**

Write C program that implements the following sorting method to sort a given list of integers in ascending order:

- i) Quick sort

**Task: 21**

Write C program that implement the following sorting method to sort a given list of integers in ascending order:

- i) Merge sort

**Text Books**

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
3. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
4. Practical C Programming, Steve Oualline, O'Reilly, SPD. TMH publications.
5. Computer Basics and C Programming, V. Rajaraman, PHI Publications.
6. Data structures and Program Design in C, R.Kruse, C.L.Tondo, B.P.Leung, M.Shashi, Pearson Education.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

I Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem L T P C  
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**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

**Objectives:**

1. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.
2. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
4. To train them to use language effectively to face interviews, group discussions, public speaking.
5. To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.

**SYLLABUS :**

The following course content is prescribed for the **English Language Laboratory** sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Situational Dialogues / Role Play.
3. 'Just A Minute' Sessions (JAM).
4. Describing Objects / Situations / People.
5. Information Transfer
6. Debate
7. Telephoning Skills.
8. Giving Directions.

**Suggested Software:**

- Cambridge Advanced Learners' English Dictionary with CD.

- The Rosetta Stone English Library.
- Clarity Pronunciation Power – Part I.
- Mastering English in Vocabulary, Grammar, Spellings, Composition
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Language in Use, Foundation Books Pvt Ltd with CD.

Oxford Advanced Learner's Compass, 7<sup>th</sup> Edition.

- Learning to Speak English - 4 CDs.
- Vocabulary in Use, Michael McCarthy, Felicity O'Den, Cambridge.
- Murphy's English Grammar, Cambridge with CD.

English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

**Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):**

1. **ENGLISH LANGUAGE COMMUNICATION SKILLS** –A Reader cum Lab Manual Course Content and Practice (with CD) Dr. A. Rama Krishna Rao, Dr.G. Natanam, Prof. S. A. Sankaranarayanan. Publishers: Anuradha Publications, Chennai  
**Author/Editor, Publishers**
2. Better English Pronunciation, **JD O' Connor, Cambridge University Press.**
3. A Foundation English Course for undergraduates (Practice exercises on skills),  
**Paul Gunashekhar Shymala Kumar Das Sachi Mahadevan, Oxford University Press.**
5. Improve Your Writing, **V.N. Arora & Lakshmi Chandra, Oxford University Press.**
6. Speaking English Effectively, **Krishna Mohan & N.P. Singh, Macmillan Publishers.**
7. English Conversation for Indian Students, **Y.V. Yardi, Orient Longman.**
8. The Written Word, **Vandana R. Singh, Oxford University Press.**
9. Strengthen Your Writing, **V.R. Narayanaswami, Orient Longman Publishers.**
10. A Handbook of Standard English and Indian Usage, **J.Sethi Prentice –Hall of India**
11. Essential Telephoning in English, **Tony Garside and Barbara Garside, Cambridge University Press.**
12. English Conversation Practice Spoken English, **Grant Taylor, Tata McGraw Hill.**

13. English Conversation Practice Spoken English, **Jayashree Balan, Vijay Nicole Imprints Pvt. Limited.**

14. How to prepare for Group Discussion and Interview, **V Sasi Kumar P V Dhamija Tata McGraw-Hill.**

15. Speaking English effectively, **Hari Mohan Prasad Rajnish Mohan Krishna Mohan Mac Millan Publishers.**

#### **DISTRIBUTION AND WEIGHTAGE OF MARKS**

##### ***English Language Laboratory Practical Paper:***

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 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 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.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem L T P C  
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### IT WORKSHOP & ENGINEERING WORKSHOP

#### PART A: IT WORKSHOP

##### Objectives :

The IT Workshop for engineers is a training lab course spread over 60 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

**PC Hardware** introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

**Internet & World Wide Web** module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

**Productivity tools** module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools and LaTeX. **(Recommended to use Microsoft office 2007 in place of MS Office 2003)**

##### **PC Hardware**

**Task 1 :** Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

**Task 2 :** Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

**Task 3 :** Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

**Task 4 :** Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

**Task 5 : Hardware Troubleshooting :** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

**Task 6 : Software Troubleshooting :** Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

##### **Internet & World Wide Web**

**Task 1 : Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

**Task 2 : Web Browsers, Surfing the Web :** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

**Task 3 : Search Engines & Netiquette :** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

**Task 4 : Cyber Hygiene :** Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

## LaTeX and Word

**Task 1 – Word Orientation:** The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

**Task 2 : Using LaTeX and Word** to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**Task 3 : Creating project abstract** Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes.

**Task 4 : Creating a Newsletter** : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

## Excel

**Excel Orientation:** The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

**Task 1: Creating a Scheduler** - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

**Task 2 : Calculating GPA** - .Features to be covered:- Cell Referencing, Formulae in excel – average, std.deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

**Task 3 : Performance Analysis** - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

## LaTeX and MS/equivalent (FOSS) tool Power Point

**Task1** : Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Powerpoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

**Task 2** : Second week helps students in making their presentations interactive.Topic covered during this week includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

**Task 3** : Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes :- Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

## Publisher

Help students in preparing their personal website using Microsoft/ equivalent (FOSS) tool publisher. Topic covered during this week includes - Publisher Orientation, Using Templates, Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages, Hosting website.

## REFERENCES :

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
2. The Complete Computer upgrade and repair book,3rd edition Cheryl A Schmidt, WILEY Dreamtech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)
5. LaTeX Companion – Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan – CISCO Press , Pearson Education.
8. Microsoft Office 2007: The Missing Manual - Chris Grover, Mathew MacDonald, E.A.Vander Veer O'reilly Media



## PART B : ENGINEERING WORK SHOP

**Pre-requisite:** Nil

**Objective:** The objective of this subject is to provide the basic concepts about tools used in WORK SHOP. Detailed concepts are given in different trades like fitting, carpentry, house wiring, etc.

**Codes / Tables:** Nil

**Question Paper Pattern:** Lab record tools, procedure of usage etc. Any two trades in end examination.

### **Syllabus**

- I. TRADES FOR EXERCISES :  
(Any **two** trades from the following with minimum of **two** exercises in each trade)
  1. Carpentry
  2. Fitting
  3. Tin-Smithy
  4. Black Smithy
  5. House-wiring
  6. Foundry
  7. Plumbing
- II. Trades for Demonstration & Exposure
  1. Demonstration of power tools
  2. Welding
  3. Machine Shop

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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### **MATHEMATICS – II (Common for all Branches)**

**UNIT-I: Ordinary Differential Equations:** Overview of differential equations- exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories and geometrical applications. Linear differential equations of second and higher order with constant coefficients, RHS term of the type  $f(X)= e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , and  $x^n$ ,  $e^{ax} V(x)$ ,  $x^n V(x)$ , method of variation of parameters. Applications bending of beams, Electrical circuits, simple harmonic motion.

**UNIT-II: Laplace Transforms:** Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms-Application of Laplace transforms to ordinary differential equations.

**UNIT-III: Fourier Series:** Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions

**UNIT-IV: Partial Differential Equations:** Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equations (Standard types and Lagrange's equations.

**UNIT-V: Applications of Partial Differential Equations:** Classification of second order linear Partial Differential Equations, Method of separation of variables separation of variables methods solutions of one dimensional heat equation, wave equation and

two-dimensional Laplace's equation under initial and boundary conditions.

**Text Books:**

1. A text Book of KREYSZIG'S Mathematical Methods, Dr .A. Ramakrishna Prasad. WILEY publications.
2. Numerical Methods & Linear Algebra – Shahnaz Bathul, Cengage Learning.
3. Mathematical Methods, T.K.V. Iyengar, B. Krishna Gandhi & others, S.Chand

**References:**

- 1 Numerical Methods, Principles, Analyses, and Algorithms, Oxford University Press
- 2 Introductory Methods of Numerical Analysis- S.S. Sastry, PHI Learning Pvt. Ltd. New Delhi.
- 3 Mathematical Methods, V. Ravindranath, Etl. Himalaya Publications
- 4 Mathematical Methods, by G. Shanker Rao, I.K. International
- 5 Mathematical Methods and Algorithms – by Todd K. Moon, Pearson Education.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**I Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

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**MATHEMATICS-III**  
**(Common for all branches)**

**UNIT-I: Roots of Non linear equations & Solution of linear equations:**

Solution of Algebraic and Transcendental Equations: Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method. Existence of solution – Gauss Elimination method – Gauss elimination with Pivoting. Gauss Jordan Method- Ill conditioned systems – Jacobi iterative method – Gauss Seidel Method – Convergence of Iterative methods.

**UNIT-II: Interpolation:**

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences – Symbolic relations and separation of symbols- Difference Equations - Differences of a polynomial-Newton's formulae for interpolation Lagrange's Interpolation formula. - Cubic spline.

**UNIT-III: Least squares method & Numerical differentiation and integration:**

Linear, Non linear and curvilinear curve fitting – Multiple linear regression - Numerical differentiation and integration Trapezoidal rule, simpson's 1/3 rule and 3/8<sup>th</sup> rule.

**UNIT -IV : Numerical solution of Initial Value Problems in Ordinary Differential Equations:**

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-

Runge-Kutta Methods –Predictor-Corrector Methods- Adams- Bashforth Method.

#### **UNIT-V: Boundary values , Eigen value problems & Solution of partial differential equations**

Shooting method, Finite difference method and solving eigen value problems, power method-Classification of partial differential equation – Finite difference methods for: Elliptic equations –Laplace equations – Leibmann’s iterative method – Parabola equations – Solution of heat equation ( One dimensional).

#### **Text Books:**

1. A text Book of KREYSZIG’S Engineering Mathematics, Vol-II Dr .A. Ramakrishna Prasad. WILEY publications.
2. A Text Book of Engineering Mathematics –II, Shahnaz Bathul, Cengage learning.
3. Engineering Mathematics II- T.K.V. Iyengar, B. Krishna Gandhi & others- S. Chand

#### **References:**

- 1 Advanced Engineering mathematics ,Greenberg, Person Education
- 2 Advanced Engineering Mathematics, Third Edition, Merle C. Potter, J.L. Golberg, Edward F. Aboufadel
- 3 Engineering Mathematics II – C. Shankariah – Uni- Tech Series
- 4 Advanced Engineering mathematics by Jain & S.R.K.Iyengar
- 5 Advanced Engineering mathematics by G.S.Grewal

### **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

I Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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### **BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

#### **UNIT- I ELECTRICAL and SINGLE PHASE AC CIRCUITS**

**Electrical Circuits** - R-L-C Parameters, Voltage and Current Independent and Dependent Sources, Source Transformation – V–I relationship for Passive elements, Kirchoff’s Laws, Network reduction techniques – series, parallel, series parallel, star–to-delta, delta-to-star transformation, Nodal Analysis,

**Single Phase AC Circuits** - R.M.S. and Average values, Form Factor, steady state analysis of series, Parallel and Series parallel Combinations of R, L and C with Sinusoidal excitation, concept of reactance, Impedance, Susceptance and Admittance – phase and phase difference, Concept of Power Factor, j-notation, complex and Polar forms of representation.

#### **UNIT- II RESONANCE and NETWORK THEOREMS**

**Resonance** – series resonance and parallel resonance circuits, concept of bandwidth and Q factor, Locus Diagrams for RL, RC and RLC Combinations for Various Parameters.

**Network Theorems** - Thevenin’s, Norton’s, Maximum Power Transfer, Superposition, Reciprocity, Tellegen’s, Millman’s and Compensation theorems for DC and AC excitations.

#### **UNIT- III P-N JUNCTION DIODE & DIODE CIRCUITS**

**P-N Junction Diode** - Diode equation, Energy Band diagram, Volt-Ampere characteristic, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

**Rectifiers and Filters** - The P-N junction as a rectifier - A Half Wave Rectifier, Ripple Factor, Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters,  $\pi$ - section Filters.

#### **UNIT- IV BIPOLAR JUNCTION TRANSISTOR**

**Bipolar Junction Transistor (BJT)** - Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

**Transistor Biasing And Stabilization** - Operating point, DC & AC load lines, Biasing - Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias stability, Stabilization against variations in  $V_{BE}$  and  $\beta$ , Bias Compensation using Diodes and Transistors.

**Transistor Configurations** - BJT modeling, Hybrid model, Determination of h-parameters from transistor characteristics, Analysis of CE, CB and CC configurations using h-parameters, Comparison of CE, CB and CC configurations.

#### **UNIT- V JUNCTION FIELD EFFECT TRANSISTOR & SPECIAL PURPOSE DEVICES**

**Junction Field Effect Transistor** - Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, Small Signal Model, Biasing FET.

**Special Purpose Devices** - Breakdown Mechanisms in Semi Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

#### **TEXT BOOKS:**

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9<sup>th</sup> Ed, 2006.
2. Millman's Electronic Devices and Circuits – J.Millman and C.C.Halkias, Satyabratajit, TMH, 2/e, 1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6<sup>th</sup> edition.

#### **REFERENCES:**

1. Introduction to Electronic Devices and Circuits-Rober T. Paynter, Pearson Education.
2. Electronic Devices and Circuits - K. Lal Kishore, B.S. Publications, 2<sup>nd</sup> Edition, 2005.
3. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal – Wiley India Pvt. Ltd. 1/e 2009.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches)- 2<sup>nd</sup> edition by Raymond A. DeCarlo and Pen-Min-Lin, Oxford University Press-2004.

5. Network Theory by N.C.Jagan & C.Lakshminarayana, B.S. Publications.

6. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

### **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**I Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

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#### **ENGINEERING CHEMISTRY (Common for EEE, ECE & CSE Branches)**

#### **UNIT – I: Water Technology :**

Introduction; Hardness of Water – Temporary and Permanent ; Units and expression of hardness; Estimation of hardness of water by complexometric method; Domestic supply of water –Treatment and Disinfection – Portable Water; Water for boiler-feed purposes; Boiler troubles – priming and foaming, Scales, Sludges, Caustic embrittlement; Corrosion of boilers; Softening of water – Internal treatment; External treatment by Lime-soda, Zeolite and Ion-exchange processes – Problems. (14 Periods)

#### **UNIT – II: Electro-Chemistry and Corrosion :**

Concept of ionic conductance ; Ionic mobilities; Electrolytic cells, Galvanic cells, Electrode potentials; Electro-chemical series; Concentration cell; Corrosion – Causes, units & effects of corrosion; Theories of corrosion Chemical and Electrochemical Corrosion; Factors affecting corrosion; Corrosion control methods – Cathodic Protection, sacrificial anode, impressed current cathode; Surface Coatings – Methods of application on metals – hot dipping, galvanizing , tinning, cladding, electroplating; Electroless plating (Cu & Ni); Organic surface coatings – Paints, their constituents & functions.

(14 Periods)

#### **UNIT – III: High Polymers :**

Concept & Definition; Classification; Types of polymerizations – chain and step –growth polymerizations; Plastics – Thermoplastics and thermosetting; Compounding and fabrication of plastics; Preparation, properties and applications of polythenes, PVC, Polystyrene, Teflon, Nylon, Bakelite, Polyester; Rubber – Natural rubber, Processing & Vulcanization; Elastomers - Styrene-butadiene rubber, thiokol; Conducting Polymers: Poly acetylene, poly aniline; Liquid crystal polymers: Characteristic uses, conduction, doping, applications; Biodegradable polymers; Fibre Reinforced Plastics (FRP).

(12 Periods)

#### **UNIT –IV : Fuels and Combustion :**

Concept and Classification of fuels; Solid fuels – Coal; Analyses of coals – Proximate and ultimate; Liquid Fuels – Petroleum; Refining, Cracking and uses; Knocking – Octane and Cetane numbers; Synthetic Petrol – Bergius & Fisher–Tropsch Processes; Gaseous Fuels; Natural Gas, LPG, CNG; Analysis of fuel gases by Orsat apparatus; Combustion – Calorific Value of Fuels – HCV, LCV; Determination of calorific value by Junker's gas calorimeter; Problems; Biodiesel. (12 Periods)

#### **UNIT – V : Chemistry of Advanced Materials :**

Conducting Polymers – Definition, Classification Properties (Dropping & Conjugation), Preparation and uses; Liquid crystals – Definition , Classification, Characteristics and Applications; Nanomaterials – Introduction, General methods of preparation of nanomaterials; Applications of nanomaterials ; Batteries – Introduction, Classification; Primary – Dry cell; Secondary – Lead acid, Ni – Cd , Lithium ion cells; Fuels cells – Definition, Classification; Hydrogen – Oxygen fuel cells; Advantages of fuel cells. (12 Periods)

#### **Text Books:**

- 1) Text book on engineering Chemistry by C P Murthy, C V Agarwal and A. Naidu; B.S.Publications, Hyderabad (2006).
- 2) A Text Book of Engineering Chemistry by Y Bharathi Kumari and Jyotsna Cherukuri, VGS Booklinks, Vijayawada, A.P., June 2009.
- 3) Engineering Chemistry by B.Sivasankar, Tata McGraw-Hill Publishing Company Ltd., New Delhi (2008)

#### **Reference Books :**

- 1) A Text Book of Engineering Chemistry by S.S. Dara, S.Chand Publications, 10<sup>th</sup> Edition (2007).
- 2) Engineering Chemistry by N. Krishna Murthy, P. Vallinayagam, D. Madhavan, Prentice-Hall of India Pvt. Ltd., New Delhi (2007).
- 3) "Fuels and Combustion" by Samir Sarkar, Universities Press ( IIT Mumbai), 3<sup>rd</sup> Edition.
- 4) A Text Book on Engineering Chemistry by Balaram Pani, Galgotia Publications Pvt. Ltd., New Delhi (2004).
- 5) Text Book of Engineering Chemistry by R. Gopalan, D. Venkappayya, Sulochana Nagarajan, Vikas Publishing House Pvt. Ltd., 3<sup>rd</sup> Edition, Noida.
- 6) Engineering Chemistry by R. Sivakumar & N. Sivakumar, Tata McGraw-Hill, New Delhi.
- 7) Engineering Chemistry by Putti R. Vijayasathy, Prentice-Hall of India Pvt. Ltd., New Delhi (2008).

- 8) Engineering Chemistry, Daniel Yesudian, Hi-Tech Publications (2002).
- 9) Engineering Chemistry by A.K. Pahari, B.S. Chauhan, Laxmi Publications Pvt. Ltd., New Delhi.
- 10) Advanced Engineering Chemistry by M.R. Senapati, Laxmi Publications Pvt. Ltd., New Delhi.

### **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**I Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

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### **APPLIED PHYSICS**

#### **UNIT-I**

**1. Elements of Statistical Mechanics:** Maxwell-Boltzman(Qualitative Treatment), Bose-Einstein(Qualitative Treatment) and Fermi-Dirac(Qualitative Treatment) Statistics (Qualitative Treatment), Photon gas , Wein's Law, Rayleigh-Jeans law,, Planck's Law of Black Body Radiation, Concept of Electron Gas, Fermi Energy, Density of States.

**2. Principles of Quantum Mechanics:** Waves and Particles, de Broglie Hypothesis , Matter Waves, Davisson and Germer's Experiment, G. P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function - Particle in One Dimensional Potential Box.

#### **UNIT-II**

**3. Band Theory of Solids:** Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Concept of Effective Mass of an Electron.

**4. Semiconductor Physics:** Fermi Level in Intrinsic and Extrinsic Semiconductors, Intrinsic Semiconductors and Carrier Concentration, Extrinsic Semiconductors and Carrier Concentration, Equation of Continuity, Direct & Indirect Band Gap Semiconductors, Hall Effect.

**5. Physics of Semiconductor Devices:** Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, I-V Characteristics of PN Junction, PN Diode as a Rectifier (Forward and Reverse Bias), Diode Equation, LED, LCD and Photo Diodes.

#### **UNIT-III**

**6. Dielectric Properties:** Basic definitions, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro- electricity.

**7. Magnetic Properties:** Basic definitions, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials

on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials, Ferrites and their Applications Concept of Perfect Diamagnetism, Meissner Effect, Magnetic Levitation.

#### UNIT-IV

**8. Lasers:** Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Carbon Dioxide Laser, Semiconductor Diode Laser, Applications of Lasers.

**9. Fiber Optics:** Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers and Refractive Index Profiles, Losses in Optical Fibers, Application of Optical Fibers in communication.

#### UNIT-V

**10. Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Combustion Methods; Top-down Fabrication: Chemical Vapour Deposition, Physical Vapour Deposition, Pulsed Laser Vapour Deposition Methods, Characterization(XRD&TEM) and Applications.

#### Text Books:

1. Modern Engineering Physics by K.Vijaya Kumar, S.Chandralingam: S. Chand & Co. Ltd.
2. Introduction to Solid State Physics by C. Kittel: Wiley Eastern Ltd.

#### References:

1. Engineering Physics by T. Sreekanth, K. Vijaya Kumar, S. Chandralingam: S. Chand & Co. Ltd
2. Engineering Physics by P.Appala Naidu, M. Chandrashaker: VGS Book Links
3. Solid State Physics by N.W. Ashcroft & N. David Merwin: Thomson Learning
4. Applied Physics by T. Bheemashankaram, G. Prasad: BS Publications
5. Engineering Physics by Sanjay D Jain, Girish G Sahasrabudha: University Press.
6. Applied Physics by P K Palanisamy: Scitech Publications
7. Modern Physics – Mani and Mehta

### JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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### ENVIRONMENTAL SCIENCE

#### UNIT - I

**MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:** Definition, Scope and Importance – Need for Public Awareness.

**NATURAL RESOURCES :** Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. - Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

#### UNIT - II

**ECOSYSTEMS :** Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

### UNIT - III

**BIODIVERSITY AND ITS CONSERVATION** : Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

### UNIT - IV

**ENVIRONMENTAL POLLUTION:** Definition, Cause, effects and control measures of :

- a. Air pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

**SOLID WASTE MANAGEMENT:** Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

### UNIT - V

**SOCIAL ISSUES AND THE ENVIRONMENT** : From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. –Consumerism and waste products. -Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

**HUMAN POPULATION AND THE ENVIRONMENT:** Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. –Case Studies.

**FIELD WORK** : Visit to a local area to document environmental assets River /forest grassland/hill/mountain -Visit to a local polluted site-Urban/Rural/industrial/ Agricultural Study of common plants, insects, birds. -Study of simple ecosystemspond, river, hill slopes, etc.

### TEXT BOOK:

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.,UniversitiesPress
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

### REFERENCE:

- 1 Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

I Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem      L T P C  
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**BASIC ELECTRICAL & ELECTRONICS LAB**

**PART A :  
ELECTRONIC WORKSHOP PRACTICE ( in 3 lab sessions) :**

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
  - Multimeters (Analog and Digital)
  - Function Generator
  - Regulated Power Supplies
    - CRO.

**PART B: (For Laboratory examination – Minimum of 12 experiments)**

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator
3. Input and Output characteristics of Transistor in CB / CE configuration
4. Full Wave Rectifier with & without filters
5. Input and Output characteristics of FET in CS configuration
6. Measurement of h parameters of transistor in CB, CE, CC configurations
7. SCR Characteristics.
8. Verification of KVL and KCL.
9. Serial and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
10. Verification of Superposition and Reciprocity theorems.

11. Verification of maximum power transfer theorem. Verification on DC, verification on AC with Resistive and Reactive loads.
12. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

I Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem      L T P C  
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**APPLIED PHYSICS LAB**

**LIST OF EXPERIMENTS**

1. Study of characteristics of LED and LASER sources.
2. Magnetic field along the axis of a current carrying coil-Stewart and Gee's method.
3. Study of characteristics of p-i-n and avalanche photo diode detectors.
4. Determination of frequency of A.C mains- Sonometer.
5. Torsional pendulum.
6. Energy gap of a material of p-n junction.
7. Bending losses of fibres.
8. Evaluation of numerical aperture of given fibre.
9. L-C-R circuit.
10. Time constant of an R-C circuit.



## JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

**Unit I Introduction & Demand Analysis:** Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. *Elasticity of Demand*: Definition, Types, Measurement and Significance of Elasticity of Demand. *Demand Forecasting*, Factors governing demand forecasting, methods of demand forecasting.

**Unit II Production & Cost Analysis:** *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. *Cost Analysis*: Cost concepts. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems) - Managerial Significance.

**Unit III Markets & New Economic Environment:** Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. *Pricing*: Objectives and Policies of Pricing. Methods of Pricing. *Business*: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, *New Economic Environment*: Changing Business Environment in Post-liberalization scenario.

**Unit IV Capital Budgeting:** Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital.. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

**Unit V Introduction to Financial Accounting & Financial Analysis:** Accounting concepts and Conventions- Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis*: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital structure Ratios and Profitability ratios. Du Pont Chart.

#### TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Atmanand: Managerial Economics, Excel, 2008.

#### REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2009
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 2009
3. Lipsey & Chrystel, Economics, Oxford University Press, 2009
4. VSP Rao, Management, Excel, 2009.
5. Domnick Salvatore: Managerial Economics In a Global Economy, Thomson, 2009.
6. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI, 2009
7. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2009.
8. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2009.
9. Dwivedi: Managerial Economics, Vikas, 2009.
10. Rajni Sofat, Preeti Hiro: Basic Accounting, PHI, 2009.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### PROBABILITY THEORY & STATISTICS

**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.

**UNIT-II: Distributions:** Binomial , Poisson & normal distributions related properties . Sampling distributions –Sampling distribution of means ( $\sigma$  known and Unknown)

**UNIT-III: Testing of Hypothesis:** Tests of hypothesis point estimations – interval estimations Bayesian estimation. Large samples, Null hypothesis – Alternate hypothesis type I, & type II errors – critical region confidential interval for mean testing of single variance. Difference single and difference between the proportions. Confidential interval for the proportions. Tests of hypothesis for the proportions.

**UNIT-IV: Small samples , Correlation and Regression:** Confidence interval for the t- distribution – Tests of hypothesis – t- distributions, F- distributions  $\chi^2$  distribution. Test of Hypothesis –. Coefficient of correlation – Regression Coefficient – The lines of regression – The rank correlation

**UNIT-V:Queuing Theory & Stochastic Processes :** Arrival Theorem - Pure Birth process and Death Process M/M/1 Model . Introduction to Stochastic Processes – Markov process classification of states – Examples of Markov Chains, Stochastic Matrix, limiting probabilities.

### Text Books:

1. A text Book of KREYSZIG'S Probability & Statistics, Dr .A. Ramakrishna Prasad. WILEY publications.
2. A text book of Probability & Statistics, Shahnaz Bathul, Cengage Learning.
3. Probability & Statistics by T.K.V.Iyengar, B.Krishna Gandhi and others, S.Chand

### References:

1. Probability & Statistics, Arnold O. Allen, Academic Press.
2. Probability & Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.
3. Probability & Statistics, Mendan Hall, Beaver Thomson Publishers.
4. Probability & Statistics, D. K. Murugeson & P. Guru Swamy, Anuradha Publishers.
5. Probability & Statistics by Hogg , Tanis , Rao, Pearson Publications

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### DIGITAL LOGIC DESIGN

#### Objectives:

This course aims at through understanding of binary number system, logic gates, combination logic and synchronous and asynchronous logic.

#### UNIT-I:

##### BOOLEAN ALGEBRA AND LOGIC GATES:

Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions canonical and standard forms, other logic operations, Digital logic gates, integrated circuits.

#### UNIT-II:

**GATE – LEVEL MINIMIZATION:** The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function, Hardware Description language (HDL)

#### UNIT-III:

**COMBINATIONAL LOGIC:** Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

#### UNIT-IV:

**SEQUENTIAL LOGIC:** Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, HDL for sequential circuits, State Reduction and Assignment, Design Procedure.

Registers, shift Registers, Ripple counters synchronous counters, other counters, HDL for Registers and counters.

#### UNIT-V

##### MEMORIES AND ASYNCHRONOUS SEQUENTIAL LOGIC:

Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices.

Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and Flow Tables, Race-Free state Assignment Hazards, Design Example.

#### TEXT BOOKS:

1. DIGITAL DESIGN – Third Edition , M.Morris Mano, Pearson Education/PHI.
2. FUNDAMENTALS OF LOGIC DESIGN, Roth, 5<sup>th</sup> Edition, Thomson.

#### REFERENCE BOOKS:

1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic and Micro Computer Design , 5<sup>TH</sup> Edition, M. Rafiquzzaman John Wiley

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

L	T	P	C
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### ADVANCED DATA STRUCTURES

#### Unit I:

C++ Class Overview- Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete), exception handling.

Function Over Loading, Operator Overloading, Generic Programming- Function and class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes, streams I/O.

#### Unit II:

Algorithms, performance analysis- time complexity and space complexity. Review of basic data structures- The list ADT, Stack ADT, Queue ADT, Implementation using template classes in C++.

Dictionaries, linear list representation, skip list representation, operations insertion, deletion and searching.

#### Unit III:

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.

Priority Queues – Definition, ADT, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion.

#### Unit IV:

External Sorting- Model for external sorting, Multiway merge, Polyphase merge.

Search Trees- Binary Search Trees, Definition, ADT, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching

Introduction to Red –Black and Splay Trees.

#### Unit V:

**Search trees** :B-Trees, B-Tree of order m, height of a B-Tree, insertion, deletion and searching, Comparison of Search Trees

**Pattern matching and Tries** : Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

#### TEXT BOOKS:

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.

2. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student edition, John Wiley and Sons.

#### REFERENCES :

1. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.

2. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson

3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.

4. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

L	T	P	C
3	1	0	4

### MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

#### 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 Homomorphisms 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. CL 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.





**Task 9 :**

.Write a C++ program to perform the following operations

- a) Insertion into an AVL-tree b) Deletion from an AVL-tree

**Task 10 :** Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.

**Task 11 :** Write a C++ program for implementing Knuth-Morris- Pratt pattern matching algorithm.

**Task 12 :**Write a C++ program for implementing Boyer – Moore Patten matching algorithm

**(Note: Use Class Templates in the above Programs. All the above programmes may also be done in JAVA)**

**TEXT BOOKS :**

1. Data Structures and Algorithms in C++, Third Edition, Adam Drozdek, Thomson.
- 2.Data Structures using C++, D.S. Malik, Thomson
3. “Java Complete Reference” Dietel and Dietel

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**II Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

L	T	P	C
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**COMPUTER ORGANIZATION & MICROPROCESSOR**

## UNIT-I

Introduction, computer abstractions and technology, machine language, instruction formats, types, sets, Logical operations, instructions for making decisions, supporting procedures, MIPS assembly language, IA32 instructions, translation and running of programs

## UNIT-II

**Computer Arithmetic** – Addition, subtraction, multiplication, division of signed and unsigned and floating point numbers  
**Performance Analysis** CPU performance and its factors, evaluating performance, performance of recent Intel processor

## UNIT-III

**Processor Design-** Data path and control units, micro programming, organizations of Pentium implementations, building a data path, multi cycle implementations, exceptions

## UNIT-IV

**Memory Hierarchy-** basics of cache, virtual memory, Pentium-IV and AMD, OPTERON memory hierarchies,  
**Pipelining** – Overview, pipe lined data path, pipe lined control, data hazards, branch hazards, exceptions, Pentium-IV pipeline

## UNIT-V

**I/O and communication-** Disk storage, buses, I/O interfacing, I/O performance measures, networks, buses and other connections between processors, memory and I/O devices.



Case study of RISC architectures for desktop server and embedded computers

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### Text Books

1. D.A. Patterson and J.L. Hennessy, Computer Organization and Design: The hardware software interface, III edition
2. Computer Organization – Car Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

### REFERENCE:

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI
2. J. Hayes, Computer Architecture and Organization, Mc Grawhill
3. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
4. Structured Computer Organization – Andrew S. Tanenbaum, 4<sup>th</sup> Edition PHI/Pearson
5. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

L	T	P	C
3	1	0	4

### DATABASE MANAGEMENT SYSTEMS

#### UNIT I :

Data base System Applications, data base 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 applications Programs – data base Users and Administrator – Transaction Management – data base 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 – Aggregative 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 – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH 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. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

#### **REFERENCES :**

1. Data base 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.

### **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**II Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

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#### **PRINCIPLES OF PROGRAMMING LANGUAGES**

##### **UNIT-I**

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments. Introduction to LISP,ALGOL-60,COBOL,BASIC,PL/I, APL, SNOBOL, SIMULA67, ALGOL, Prolog, Ada, Small talk

Combining imperative and object-oriented language-C++

Imperative based object-oriented language- Introduction to Java, C#.

Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

##### **UNIT-II**

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level,

Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

#### UNIT-III

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines, Implementing subroutines.

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95

#### UNIT-IV

Concurrency: Subprogram level concurrency, semaphores, monitors, message passing, Java threads, C# threads. Exception handling & Event Handling: Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

#### UNIT-V

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages, Logic programming Languages

Logic Programming Language : Introduction and overview of logic programming, basic elements of prolog, application of logic programming. Scripting Language: Pragmatics, Key Concepts, Case Study : Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

#### TEXT BOOKS:

1. Concepts of Programming Languages Robert .W. Sebesta 8/e, Pearson Education,2008.
2. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech,rp-2007.

#### REFERENCE BOOKS:

1. Programming Languages, 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.
2. Programming Languages, K. C.Louden, 2nd Edition, Thomson,2003.
3. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
4. Programming in Prolog, W.F. Clocksin,& C.S.Mellish, 5th Edition, Springer.
5. Programming Python, M.Lutz, 3rd Edition, O'reilly,SPD, rp-2007.

6. Core Python Programming, Chun, II Edition, Pearson Education, 2007.
7. Guide to Programming with Python, Michael Dawson, Thomson, 2008.

### JNTUH COLLEGE OF ENGINEERING HYDERABAD

II Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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#### MANAGEMENT SCIENCE

**Unit I Introduction to Management & Organisation:** Concepts of Management and organization- nature, importance and Functions and Theories of Management, Systems Approach to Management, Leadership Styles, Social responsibilities of Management. Designing Organisational Structures: Basic concepts related to Organisation - Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

**Unit II Operations & Marketing Management:** Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control: control charts for Variables and Attributes, (simple Problems) and Acceptance Sampling, Deming's contribution to quality. Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records - Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle, Channels of distribution.

**Unit III Human Resources Management (HRM):** Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

**Unit IV Project Management (PERT/CPM):** Network Analysis,

Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

**Unit V Strategic Management and Contemporary Strategic Issues:**

Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Contemporary Management Practices: Basic concepts of MIS, End User Computing, Materials Requirement Planning (MRP), Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering and Bench Marking, Balanced Score Card.

**TEXT BOOKS:**

1. Aryasri: *Management Science*, TMH, 2009.
2. Stoner, Freeman, Gilbert, *Management*, Pearson Education, 2009.

**REFERENCES :**

1. Kotler Philip & Keller Kevin Lane: *Marketing Management*, PHI, 2009
2. Koontz & Weihrich: *Essentials of Management*, TMH, 2009.
3. Thomas N.Duening & John M.Ivancevich *Management—Principles and Guidelines*, Biztantra,2009.
4. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2009.
5. Memoria & S.V.Gauker, *Personnel Management*, Himalaya, 2009
6. Samuel C.Certo: *Modern Management*, PHI, 2009
7. Schermerhorn, Capling, Poole & Wiesner: *Management*, Wiley, 2009.
8. Parnell: *Strategic Management*, Cengage,2009.
9. Lawrence R Jauch, R.Gupta &William F.Glueck: *Business Policy and Strategic Management*, Frank Bros.2009.
10. VSP Rao: *Strategic Management*, Excel, 2009

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**II Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

L	T	P	C
3	1	0	4

**FORMAL LANGUAGES AND AUTOMATA THEORY**

The purpose of this course is to acquaint the student with an overview of the theoretical foundations of computer science from the perspective of formal languages.

- Classify machines by their power to recognize languages.
- Employ finite state machines to solve problems in computing.
- Explain deterministic and non-deterministic machines.
- Comprehend the hierarchy of problems arising in the computer sciences.

**UNIT I :**

**Fundamentals :** Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers.

**Finite Automata :** NFA with  $\hat{\epsilon}$  transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without  $\hat{\epsilon}$  transitions, NFA to DFA conversion, minimisation of FSM, equivalence between two FSM's, Finite Automata with output-Moore and Melay machines.

**UNIT II:**

**Regular Languages :** Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets (proofs not required).

**Grammar Formalism** : Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, sentential forms. Right most and leftmost derivation of strings.

**UNIT III:**

**Context Free Grammars:** Ambiguity in context free grammars. Minimization of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted).

**Push Down Automata** : Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required). Introduction to DCFL and DPDA.

**UNIT IV :**

**Turing Machine** : Turing Machine, definition, model, design of TM, CSL, LBA Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required).

**UNIT V:**

**Computability Theory** : Chomsky hierarchy of languages, linear bounded automata and context sensitive language, LR(0) grammar, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

**TEXT BOOKS :**

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education
2. Introduction to Theory of Computation –Sipser 2nd edition Thomson

**REFERENCES :**

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Introduction to languages and the Theory of Computation ,John C Martin, TMH
3. "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.
- 4 Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekar, 2nd edition, PHI

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**II Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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**DESIGN AND ANALYSIS OF ALGORITHMS**

**UNIT I :**

Introduction: Algorithm, Psuedo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis. 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, spanning trees. Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles. connected components and biconnected components.

**UNIT III:**

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

**UNIT IV:**

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

**UNIT V:**

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NPComplete classes, Cook's theorem.

**TEXT BOOKS :**

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
2. Design and Analysis Algorithms - [Parag Himanshu Dave](#), [Himanshu Bhalchandra Dave](#)  
Publisher: Pearson
3. Algorithm Design: Foundations, Analysis and Internet examples, M.T. Goodrich and R. Tomassia, John Wiley and sons.

**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. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, Mc Graw Hill.
3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.
4. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
5. Algorithms – Richard Johnson baugh and Marcus Schaefer, Pearson Education

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

<b>II Year IDP (B.Tech. CSE &amp; M.Tech./MBA) II-Sem</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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**COMPUTER ORGANIZATION AND MICROPROCESSOR LAB**

**Computer Organization**

Write assembly language programs for the following using MASAM.

1. Write assembly language programs to evaluate the expressions:
  - i)  $a = b + c - d * e$
  - ii)  $z = x * y + w - v + u / k$
  - a. Considering 8-bit, 16 bit and 32 bit binary numbers as b, c, d, e.
  - b. Considering 2 digit, 4 digit and 8 digit BCD numbers.
2. Write an ALP of 8086 to add two exponential numbers which are in IEEE 754 notation. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
3. Write an ALP of 8086 to take N numbers as input. And do the following operations on them.
  - a. Arrange in ascending and Descending order.
  - b. Find max and minimum
  - c. Find average

Considering 8-bit, 16 bit binary numbers and 2 digit, 4 digit and 8 digit BCD numbers. Display the results by using "int xx" of 8086. Validate program for the boundary conditions.

4. Write an ALP of 8086 to take a string of as input (in 'C' format) and do the following Operations on it.

- a. Find the length
- b. Find it is Palindrome or not
- c. Find whether given string substring or not.
- d. Reverse a string
- e. Concatenate by taking another string

Display the results by using "int xx" of 8086.

5. Write the ALP to implement the above operations as procedures and call from the main procedure.

6. Write an ALP of 8086 to find the factorial of a given number as a Procedure and call from the main program which display the result.

## **MICROPROCESSORS AND INTERFACING LAB**

### **I. Microprocessor 8086 :**

1. Introduction to MASM/TASM.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

### **II. Interfacing :**

1. 8259 – Interrupt Controller : Generate an interrupt using 8259 timer.
2. 8279 – Keyboard Display : Write a small program to display a string of characters.
3. 8255 – PPI : Write ALP to generate sinusoidal wave using PPI.
4. 8251 – USART : Write a program in ALP to establish Communication between two processors.

### **III. Microcontroller 8051 :**

1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.

## **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**II Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

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### **DATABASE MANAGEMENT SYSTEMS LAB**

Objective: This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database "Roadway travel". Students are expected to use "Mysql" database.

### **Roadway Travels**

"Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservations
- Ticketing
- Cancellations

### **Reservations:**

Reservations are directly handled by booking office. Reservations can be made 60 days in advance in either cash or credit. In

case the ticket is not available, a wait listed ticket is issued to the customer. This ticket is confirmed against the cancellation.

**Cancellation and Modifications:**

Cancellations are also directly handed at the booking office. Cancellation charges will be charged.  
*Wait listed tickets that do not get confirmed are fully refunded.*

**Week1: E-R Model**

Analyze the [problem](#) carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.  
 Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Example: **Entities:**

1. BUS
2. Ticket
3. Passenger

**PRIMARY KEY ATTRIBUTES:**

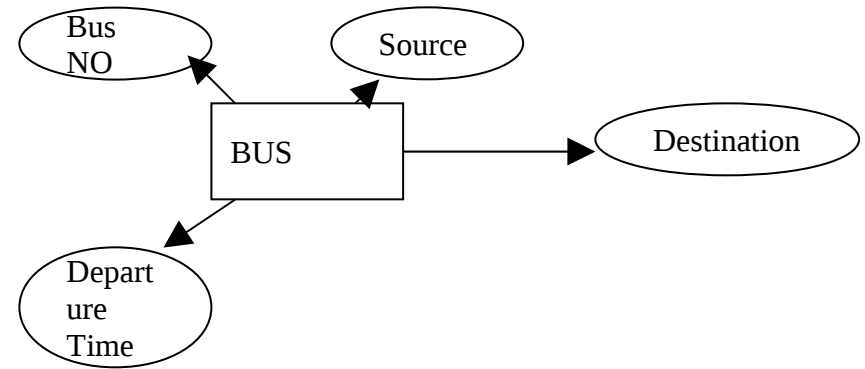
1. Ticket ID (Ticket Entity)
2. Passport ID (Passenger Entity)

Apart from the above mentioned entities you can identify more.  
 The above mentioned are few.

**Week2: Concept design with E-R Model**

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

**Example: E-r diagram for bus**



**Week3: Relational Model**

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multivalued, and Derived) have different way of representation.

Example: The passenger tables look as below. This is an example. You can add more attributes based on your E-R model.

Passenger				
Name	Age	Sex	Address	<u>Passport ID</u>

**Week4: Normalization**

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances



of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

### Week5: Installation of Mysql and practicing DDL commands

Installation of MySQL. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases If not required. You will also try truncate, rename commands etc.

Example for creation of a table.

```
CREATE TABLE Passenger (  
    Passport id      INTEGER PRIMARY KEY,  
    Name CHAR (50) NULL,  
    Age Integer,  
    Sex Char  
);
```

**Note: Detailed creation of tables is given at the end.**

### Week6: Practicing DML commands

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

#### Inserting values into Bus table:

Insert into Bus values (1234,'hyderabad', 'tirupathi');  
Insert into Bus values (2345,'hyderabd','Banglore');

#### Inserting values into Bus table:

Insert into Passenger values (1, 45,'ramesh', 45,'M','abc123');  
Insert into Passenger values (2, 78,'geetha', 36,'F','abc124');

### Few more Examples of DML commands:

Select \* from Bus; (selects all the attributes and display)  
UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

### Week7: Querying

In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

#### Practice the following Queries:

1. Display unique PNR\_no of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Display the source and destination having journey time more than 10 hours.
5. Find the ticket numbers of the passengers whose name start with 'A' and ends with 'H'.
6. Find the names of passengers whose age is between 30 and 45.
7. Display all the passengers names beginning with 'A'
8. Display the sorted list of passengers names
9. Display the Bus numbers that travel on Sunday and Wednesday
10. Display the details of passengers who are traveling either in AC or NON\_AC(Using only IN operator)

### Week8 and week9: Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

- Write a Query to display the Information present in the Passenger and cancellation tables. **Hint: Use UNION Operator.**
- Write a Query to display different travelling options available in British Airways.
- Display the number of days in a week on which the 9W01 bus is available.
- Find number of tickets booked for each PNR\_no using GROUP BY CLAUSE. **Hint: Use GROUP BY on PNR\_No.**

- Find the distinct PNR numbers that are present.
- Find the number of tickets booked in each class where the number of seats is greater than 1. **Hint:** Use GROUP BY, WHERE and HAVING CLAUSES.
- Find the total number of cancelled seats.
- Write a Query to count the number of tickets for the buses, which travelled after the date '14/3/2009'. **Hint:** Use HAVING CLAUSES.

### Week10: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

Eg: **CREATE TRIGGER updcheck BEFORE UPDATE ON passenger FOR EACH ROW BEGIN IF NEW.TickentNO > 60 THEN SET New.Tickent no = Ticket no; ELSE SET New.Ticketno = 0; END IF; END;**

### Week11: Procedures

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

Eg:**CREATE PROCEDURE myProc() BEGIN SELECT COUNT(Tickets) FROM Ticket WHERE age>=40; End;**

### Week12: Cursors

In this week you need to do the following: Declare a cursor that defines a result set. Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done

```
CREATE PROCEDURE myProc(in_customer_id INT)
BEGIN
DECLARE v_id INT;
DECLARE v_name VARCHAR(30);
DECLARE c1 CURSOR FOR SELECT stdId,stdFirstname FROM
students WHERE stdId=in_customer_id;
OPEN c1;
FETCH c1 into v_id, v_name;
Close c1;
END;
```

### Tables

#### BUS

Bus No: Varchar: Pk  
Source : Varchar  
Destination : Varchar

#### Passenger

PNR\_No : Numeric(9) : PK  
Ticket\_No: Numeric (9)  
Name: Varchar(15)  
Age : int (4)  
Sex:Char(10) : Male / Female  
PPNO: Varchar(15)

#### Reservation

PNR\_No: Numeric(9) : FK  
Journey\_date : datetime(8)  
No\_of\_seats : int (8)  
Address : Varchar (50)  
Contact\_No: Numeric (9) --> Should not be less than 9 and Should not accept any other character other than Integer  
Status: Char (2) : Yes / No

#### Cancellation

PNR\_No: Numeric(9) : FK  
Journey\_date : datetime(8)  
No\_of\_seats : int (8)  
Address : Varchar (50)  
Contact\_No: Numeric (9) --> Should not be less than 9 and Should not accept any other character other than Integer  
Status: Char (2) : Yes / No

#### Ticket

Ticket\_No: Numeric (9): PK

Journey\_date : datetime(8)  
Age : int (4)  
Sex:Char(10) : Male / Female  
Source : Varchar  
Destination : Varchar  
Dep\_time : Varchar

### Text Books:

1. Introduction to SQL,Rick F.Vander Lans,Pearson education.
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova,Pearson education.
3. Oracle PL/SQL Programming,Steven Feuerstein,SPD.
4. SQL & PL/SQL for Oracle 10g,Black Book,Dr.P.S.Deshpande,Dream Tech.
5. Oracle Database 11g PL/SQL Programming,M.Mc Laughlin,TMH.
6. SQL Fundamentals,J.J.Patrick,Pearson Education.

### JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### Department Elective -1

### 1. ADVANCED COMPUTER ARCHITECTURE

#### UNIT I

Fundamentals of Computer design, Changing faces of computing and task of computer designer, Technology trends, Cost price and their trends, measuring and reporting performance, quantitative principles of computer design, Amdahl's law.

Instruction set principles and examples- Introduction, classifying instruction set- memory addressing- type and size of operands, operations in the instruction set.

#### UNIT II

**Pipelines** : Introduction ,basic RISC instruction set ,Simple implementation of RISC instruction set, Classic five stage pipe line for RISC processor, Basic performance issues in pipelining , Pipeline hazards, Reducing pipeline branch penalties.

**Memory hierarchy design** : Introduction, review of ABC of cache, Cache performance , Reducing cache miss penalty, Virtual memory.

#### UNIT III

**Instruction level parallelism the hardware approach** - Instruction-level parallelism, Dynamic scheduling, Dynamic scheduling using Tomasulo's approach, Branch prediction, high performance instruction delivery-hardware based speculation.

**ILP software approach**- Basic compiler level techniques, static branch prediction, VLIW approach, Exploiting ILP, Parallelism at compile time, Cross cutting issues -Hardware verses Software.

#### UNIT IV

Multi Processors and Thread level Parallelism- Introduction, Charactersitics of application domain, Systematic shared memory architecture, Distributed shared – memory architecture, Synchronization.

#### UNIT V

**Inter connection and networks** – Introduction, Interconnection network media, Practical issues in interconnecting networks, Examples of inter connection, Cluster , Designing of clusters.

**Intel architecture** : intel IA- 64 ILP in embedded and mobile markets Fallacies and pit falls

#### Text Book

1. John L. Hennessy, David A. Patterson, Computer Architecture: A Quantitative Approach, 3rd Edition, An Imprint of Elsevier.

#### Reference Books

1. John P. Shen and Miikko H. Lipasti, Modern Processor Design : Fundamentals of Super Scalar Processors
2. Computer Architecture and Parallel Processing ,Kai Hwang, Faye A.Brigs., MC Graw Hill.,
3. Advanced Computer Architecture - A Design Space Approach, Dezso Sima, Terence Fountain, Peter Kacsuk ,Pearson ed.

control Mechanisms & Algorithms, Time stamped & Optimistic concurrency control Algorithms, Deadlock Management.

#### UNIT –IV

**Distributed DBMS Reliability:** Reliability concepts and Measures, fault-tolerance in Distributed systems, failures in Distributed DBMS, local & Distributed Reliability Protocols, site failures and Network partitioning.

**Parallel Database Systems:** Database Series, Parallel Architecture, Parallel DBMS Techniques, Parallel exception problems, Parallel Execution for Hierarchical architecture.

#### UNIT-V

**Distributed object Database Management Systems:** Fundamental object concepts and Models, Object Distributed Design, Architectural Issues, Object Management, Distributed Object storage, Object query Processing.

**Object Oriented Data Model :** Inheritance, Object identity, persistent programming languages, persistence of objects, comparing OODBMS and ORDBMS

#### Text Books:

1. M.Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Willipse Pelagatti: Distributed Databases, McGraw Hill.
3. Henry F Korth, A Silberchatz and Sudershan : Database System Concepts, MGH
4. Raghuramakrishnan and Johhanes Gehrke: Database Management Systems, MGH

### JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

L	T	P	C
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Department Elective -1

#### ADVANCED DATABASE

##### UNIT-I

**Introduction;** Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.

**Distributed DBMS Architecture:** Architectural Models for Distributed DBMS, DDMBS Architecture.

**Distributed Database Design:** Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

##### UNIT-II

**Query Processing and decomposition:** Query Processing Objectives, Characterization of query processors, layers of query processing, query decomposition, Localization of distributed data.

**Distributed query Optimization:** Query optimization, centralized query optimization, Distributed query optimization algorithms.

##### UNIT-III

**Transaction Management:** Definition, properties of transaction, types of transactions. Distributed concurrency control: Serializability, concurrency

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem**

**L T P C  
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**Department Elective -1**

**EMBEDDED SYSTEMS**

**UNIT - 1 : INTRODUCTION TO EMBEDDED SYSTEMS**

Definition and Classification - Overview of Processors and hardware units in an embedded system - Software embedded into the system - Exemplary Embedded Systems - Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits.

**UNIT - 2 : DEVICES AND BUSES FOR DEVICES NETWORK**

I/O Devices - Device I/O Types and Examples - Synchronous - Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports- Timer and Counting Devices - '12C', 'USB', 'CAN' and advanced I/O Serial high speed buses- ISA, PCI, PCI-X, cPCI and advanced buses.

**UNIT - 3 : PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C, C++**

Programming in assembly language (ALP) vs. High Level Language - C Program Elements, Macros and functions -Use of Pointers - NULL Pointers - Use of Function Calls - Multiple function calls in a Cyclic Order in the Main Function Pointers - Function Queues and Interrupt Service Routines Queues Pointers - Concepts of EMBEDDED PROGRAMMING in C++ - Objected Oriented Programming - Embedded Programming in C++, 'C' Program compilers - Cross compiler - Optimization of memory codes.

**UNIT - 4 : REAL TIME OPERATING SYSTEMS - PART - 1**

Definitions of process, tasks and threads - Clear cut distinction between functions - ISRs and tasks by their characteristics - Operating System Services- Goals - Structures- Kernel - Process Management - Memory Management - Device Management - File System Organisation and Implementation - I/O Subsystems - Interrupt Routines Handling in RTOS, REAL TIME OPERATING SYSTEMS : RTOS Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics - Co-operative Round Robin Scheduling - Cyclic Scheduling with Time Slicing (Rate Monotonics Co-operative Scheduling) - Preemptive Scheduling Model strategy by a Scheduler - Critical Section Service by a Preemptive Scheduler - Fixed (Static) Real time scheduling of tasks - INTER PROCESS COMMUNICATION AND SYNCHRONISATION - Shared data problem - Use of Semaphore(s) - Priority Inversion Problem and Deadlock Situations - Inter Process Communications using Signals - Semaphore Flag or mutex as Resource key - Message Queues - Mailboxes - Pipes - Virtual (Logical) Sockets - Remote Procedure Calls (RPCs).

**UNIT - 5 : REAL TIME OPERATING SYSTEMS - PART - 2**

Study of Micro C/OS-II or Vx Works or Any other popular RTOS - RTOS System Level Functions - Task Service Functions - Time Delay Functions - Memory Allocation Related Functions - Semaphore Related Functions - Mailbox Related Functions - Queue Related Functions - Case Studies of Programming with RTOS - Understanding Case Definition - Multiple Tasks and their functions - Creating a list of tasks - Functions and IPCs - Exemplary Coding Steps.

**TEXT BOOKS**

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint Oct. 2003

**REFERENCES**

1. Steve Heath, Embedded Systems Design, Second Edition-2003
2. David E.Simon, An Embedded Software Primer, Pearson

- Education Asia, First Indian Reprint 2000.
- Wayne Wolf, Computers as Components; Principles of Embedded Computing System Design - Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001
  - Frank Vahid and Tony Givargis, Embedded Systems Design - A Unified Hardware /Software Introduction, John Wiley, 2002.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

L T P C  
4 0 0 4

Department Elective -1

### ADVANCED DATA STRUCTURES

#### UNIT-I

Different strategies for problem solving, need for OOP, Overview of OOP Principles- Encapsulation, Inheritance, Polymorphism. C++ class overview- class definition, objects, class members, access control, class scope, constructors and destructors, inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete).

#### UNIT-II

Polymorphism and Inheritance: Function overloading, operator overloading, generic programming-function and class templates, inheritance basics, base and derived classes, different types of inheritance, base class access control, virtual base class, function overriding, run time polymorphism using virtual functions, abstract classes. Streams, libraries and error handling – Stream classes hierarchy, console i/o, formatted I/O, file streams and string streams, exception handling mechanism, Standard Template Library.

#### UNIT-III

Algorithms, performance analysis-time complexity and space complexity, Review of basic data structures-the list ADT, stack ADT, implementation using template class in C++, queue ADT, implementation using template class, priority queues-definition, ADT, heaps, definition, insertion and deletion, application-heap sort, disjoint sets-disjoint set ADT, disjoint set operations, union and find algorithms.

#### UNIT-VI

Skip lists and Hashing: Dictionaries, 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.

#### UNIT-V

Search trees: Binary search trees, definition, ADT, implementation, operations- Searching, insertion and deletion, Balanced search trees-AVL trees, definition, height of an AVL tree, representation, operations-insertion, deletion and searching. Red –Black trees ,Splay Trees, B-Trees Pattern matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix trees, Search engines-Inverted files.

#### Text books:

- Data structures, Algorithms and Applications in C++, S.Sahni, University press (India) pvt ltd, 2nd edition, Orient Longman pvt.ltd.
- Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and D.Mount, Wiley student edition, John Wiley and Sons.

#### Reference books:

- Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education Ltd., second edition.
- Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
- C++ primer, 3rd edition, S.B.Lippman, Pearson education Ltd.
- Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.
- Data structures and algorithms in C++, 3<sup>rd</sup> Edition, Adam Drozdek, Thomson

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### COMPILER DESIGN

#### UNIT – I:

**Overview of Compilation:** Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

#### UNIT – II:

**Top down Parsing:** Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Non recursive predictive parsing.

**Bottom up parsing:** Shift Reduce parsing, Operator precedence parsing, LR parsers, Error recovery in parsing, handling ambiguous grammar, YACC – automatic parser generator.

#### UNIT – III

**Syntax – Directed Translation:** Syntax Directed Definitions, Construction of Syntax Trees, Bottom Evaluation of S-attributed Definitions, attributed definitions, Top down translation, Bottom-up evaluation of inherited attributes.

**Type Checking:** Type systems, Specification of a simple type checker, equivalence of type expressions.

Storage Organization, storage allocation strategies, parameter passing.

**Symbol table,** Language facilities for dynamic storage.

#### UNIT IV

**Intermediate Code generation:** Intermediate languages for code generation.

#### Code Generation:

Issues in the design of a code generator, the target machine run time storage management, Next use information, DAG representation of basic blocks.

Dynamic Programming code generation algorithm.

#### UNIT V

**Code Optimization:** Introduction, Principal source of optimization, local optimization, loop optimization, frequency reduction, folding.

**Data flow analysis:** Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

#### Text Books:

1. Compilers: Principles, Techniques and Tools: Alfred V.Aho,Ravi Sethi, Jeffrey D. Ullman; Pearson Education
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

#### Reference Books:

1. lex &yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler-Cooper & Linda, Elsevier.
4. Compiler Construction, Loudon, Thomson..

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem**

**L T P C**  
**4 0 0 4**

**Open Elective- 1**

**OPTIMIZATION TECHNIQUES**

**UNIT I**

**SINGLE VARIABLE NON-LINEAR UNCONSTRAINED OPTIMIZATION:**  
One dimensional Optimization methods:- Uni-modal function, elimination methods, Fibonacci method, golden section method, interpolation methods – quadratic & cubic interpolation methods.  
Multi variable non-linear unconstrained optimization: Direct search method – Univariate method - pattern search methods –Hook -Jeeves, Rosenbrock search methods- gradient methods, gradient of function, steepest decent method, Fletcher Reeves method.

**UNIT II**

**GEOMETRIC PROGRAMMING:**  
Polynomials – arithmetic - geometric inequality – unconstrained G.P-constrained G.P ( $\leq$  type)

**UNIT III**

**DYNAMIC PROGRAMMING:**  
Terminology-Multistage decision process, principles of optimality, application of dynamic programming, production: Short path problem-Inventory- Allocation.

**UNIT IV**

Linear programming  
Formulation – Sensitivity analysis. Change in the constraints, cost coefficients, coefficients of the constraints, addition and deletion of variable, constraints.  
Simulation – Introduction – Types- steps – application – inventory – queuing.

**UNIT V**

Integer Programming  
Introduction – formulation – Gomory cutting plane algorithm – branch and bound method  
**STOCHASTIC PROGRAMMING:**  
Basic concepts of probability theory, random variables- distributions- mean, variance, correlation, co variance, joint probability distribution- stochastic linear Programming.

**Text Books:**

1. Optimization theory & Applications / S.S.Rao / New Age International.
2. Optimization for engineering design/ J.K Sharma
3. Optimization Techniques theory and practice / M.C.Joshi, K.M.Moudgalya/ Narosa Publications

**Reference Books:**

- 1) Operations Research/ Mac Millan
- 2) Optimization Techniques /Benugundu & Chandraputla / Pearson Asia
- 3) Optimization in operations research / R.L.Rardin  
Simulation Modelling and Analysis/ Law & Kelton TMH



## JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

L	T	P	C
4	0	0	4

Open Elective- 1

### NUMBER THEORY

#### UNIT I

**Divisibility and Factorization** :-Divisibility: Definition, properties, division algorithm, greatest integer function , Primes: Definition, Euclid's Theorem, Prime Number Theorem (statement only), Goldbach and Twin Primes conjectures, Fermat primes, Mersenne primes , The greatest common divisor: Definition, properties, Euclid's algorithm, linear combinations and the gcd , The least common multiple: Definition and properties, The Fundamental Theorem of Arithmetic: Euclid's Lemma, canonical prime factorization, divisibility, gcd, and lcm in terms of prime factorizations , Primes in arithmetic progressions: Dirichlet's Theorem on primes in arithmetic progressions (statement only) .

#### UNIT II

**Congruences** :- Definitions and basic properties, residue classes, complete residue systems, reduced residue systems , Linear congruences in one variable, Euclid's algorithm , Simultaneous linear congruences, Chinese Remainder Theorem , Wilson's Theorem , Fermat's Theorem, pseudoprimes and Carmichael numbers , Euler's Theorem

#### UNIT III

**Arithmetic functions**:-Arithmetic function, multiplicative functions: definitions and basic examples , The Moebius function, Moebius inversion formula , The Euler phi function, Carmichael conjecture , The number-of-divisors and sum-of-divisors functions , Perfect numbers, characterization of even perfect numbers .

#### UNIT IV

**Quadratic residues**:- Quadratic residues and nonresidues , The Legendre symbol: Definition and basic properties, Euler's Criterion, Gauss' Lemma ,The law of quadratic reciprocity ,

#### UNIT V

**Primitive roots** :- The order of an integer , Primitive roots: Definition and properties, The Primitive Root Theorem: Characterization of integers for which a primitive root exists

#### Additional Topics

Continued fractions and rational approximations Sums of squares ,Pythagorean triples ,Pell's equation,Partitions ,Recurrences ,Applications to primality testing ,Application to cryptography

#### Text Books:

1. Ivan Niven & H.S.Zuckerman, "An Introduction to Number Theory", Wiley Eastern Limited.
2. T.M. Apostol, "An Introduction to Analytic number Theory", Springer International Student's Edition.



Agreement on Trade Related Aspects of Intellectual Property Rights – Patent Law Treaty.

**TEXT BOOK:**

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

**REFERENCES:**

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

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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4 0 0 4

**SOFTWARE ENGINEERING**

**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. **Object-Oriented Design:** Objects and object classes, An Object-Oriented design process, Design evolution.

**UNIT-IV:**

**Performing User interface design:** Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

**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, 6<sup>th</sup> edition. McGrawHill International Edition.
2. Software Engineering- Sommerville, 7<sup>th</sup> edition, Pearson education.

**REFERENCE BOOKS:**

1. Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
3. Systems Analysis and Design- Shely Cashman Rosenblatt, Thomson Publications.
4. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### OPERATING SYSTEMS

#### UNIT – I:

**Computer System and Operating System Overview:** Overview of Computer System hardware – Instruction execution – I/O function – Interrupts – Memory hierarchy – I.O Communication techniques. Operating System Objectives and functions – Evaluation of operating System – Example Systems.

**Process Description** – Process Control –Process States- Process and Threads - Examples of Process description and Control.

#### UNIT- II:

**Concurrency:** Principles of Concurrency – Mutual Exclusion – Software and hardware approaches – semaphores – Monitors – Message Passing – Readers Writers Problem.

**Principles of deadlock** – deadlock prevention, detection and avoidance dining philosophers problem – example Systems.

#### UNIT –III:

**Memory Management:** Memory Management requirements – loading programmes in to main memory – virtual memory – hardware and Control structures – OS Software – Examples of Memory Management.

#### UNIT – IV:

**Uniprocessor Scheduling:** Types of Scheduling – Scheduling algorithms – I/O management and Disc Scheduling – I/o devices – organization – of I/O function – OS design issues – I/O buffering – Disk I/O – disk scheduling Policies – examples System.

#### UNIT – V:

**File Management and Security:** Overview of file management – file organization and access – File Directories – File sharing – record blocking – secondary Storage Management – example system.

**Security:** Security threats – Protection – intruders – Viruses – trusted System.

#### TEXT BOOKS:

1. Operating Systems' – Internal and Design Principles Stallings, Fifth Edition–2005, Pearson education/PHI
2. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7<sup>th</sup> Edition, John Wiley

#### REFERENCE BOOKS:

1. Operating System A Design Approach–Crowley, TMH.
2. Modern Operating Systems, Andrew S Tanenbaum 2<sup>nd</sup> edition Pearson/PHI

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### DATA COMMUNICATIONS & COMPUTER NETWORKS

#### UNIT-I

**Digital Modulation techniques:** Review of ASK, FSK, PSK, Binary FSK and PSK, QPSK, Phase PSK, quadrature AM, QAM, 16 QAM, carrier recovery, differential BPSK.

Data Communication methods: Data communication circuit configuration topologies, point-to-point, multi-drop, star, ring, transmission modes, 2-wire and 4-wire operation, data communication codes, error detection, equalization, error correction, check sum method, synchronization line, control unit, UART, USRT, serial interfaces, terminal types, data modems, modulation, interface, operations on 2-wire, 4-wire and dial up lines, multi stream and intelligent modems, acoustic coupler, loop delay.

#### UNIT-II

**Data communication protocols:** Asynchronous protocols, synchronous protocols, IBM bisync protocol, SDLC, HDLC

**Line Protocols:** Half-duplex point-to-point, half duplex multi point, full-duplex point-to-point and multi-point.

**Digital Multiplexing:** Time division multiplexing, code, combo chip, block diagram of PCM-TDM, FDM, data transmission on FDM systems, hybrid data.

#### UNIT-III

**Introduction:** OSI, TCP/IP and other networks models, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, MAN.

**Physical Layer:** Transmission media copper, twisted pair, wireless.

**Data link layer:** Design issues, framing, Elementary Protocol-stop and wait, Sliding Window, Slip, Data link layer in HDLC.

#### UNIT-IV

**Medium Access sub layer:** ALOHA, MAC addresses, Carrier sense multiple access. IEEE 802.X Standard Ethernet, Bridges.

**Network Layer:** Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing,

**Congestion Control Algorithms** – General Principles – of Congestion prevention policies. **Internet working:** The Network layer in the internet.

#### UNIT –V

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

**Application Layer** –Domain name system, SNMP, Electronic Mail; the World WEB, Multi Media.

#### TEXT BOOKS:

1. WTOMASI: Advanced Electronic Communication Systems.
2. Computer Networks -- Andrew S Tanenbaum, 4<sup>th</sup> Edition. Pearson Education/PHI
3. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

#### REFERENCE BOOKS:

1. Thousley “Data Communications and Tele processing Systems, 2<sup>nd</sup> Edition PHI
2. BERTSEKIS & GALLAGA: Data Networks .Prentice hall
3. An Engineering Approach to Computer Networks-S.Keshav, 2<sup>nd</sup> Edition, Pearson Education
4. Understanding communications and Networks, 3<sup>rd</sup> Edition, W.A.Shay, Thomson

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### COMPILER DESIGN & COMPUTER NETWORKS LAB

1. Consider the following mini Language, a simple procedural high-level language, only operating on integer data, with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of the language is defined by the following BNF grammar:

```
<program> ::= <block>
<block> ::= { <variabledefinition> <slist> }
           | { <slist> }
<variabledefinition> ::= int <vardeflist> ;
<vardeflist> ::= <vardec> | <vardec> , <vardeflist>
<vardec> ::= <identifier> | <identifier> [ <constant> ]
<slist> ::= <statement> | <statement> ; <slist>
<statement> ::= <assignment> | <ifstatement> | <whilestatement>
              | <block> | <printstatement> | <empty>
<assignment> ::= <identifier> = <expression>
               | <identifier> [ <expression> ] = <expression>
<ifstatement> ::= if <bexpression> then <slist> else <slist> endif
               | if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist> enddo
<printstatement> ::= print ( <expression> )
```

```
<expression> ::= <expression> <addingop> <term> | <term> |
<addingop> <term>
<bexpression> ::= <expression> <relop> <expression>
<relop> ::= < | <= | == | >= | > | !=
<addingop> ::= + | -
<term> ::= <term> <multop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [ <expression> ]
           | ( <expression> )
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= <letter> | <digit>
<letter> ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z
<digit> ::= 0|1|2|3|4|5|6|7|8|9
<empty> has the obvious meaning
Comments (zero or more characters enclosed between the standard
C/Java-style comment brackets /*...*/) can be inserted. The language
has rudimentary support for 1-dimensional arrays. The declaration int a[3]
declares an array of three elements, referenced as a[0], a[1] and a[2].
Note also that you should worry about the scoping of names.
A simple program written in this language is:
{ int a[3],t1,t2;
  t1=2;
  a[0]=1; a[1]=2; a[t1]=3;
  t2=-(a[2]+t1*6)/(a[2]-t1);
  if t2>5 then
    print(t2);
  else {
    int t3;
    t3=99;
    t2=-25;
    print(-t1+t2*t3); /* this is a comment
                      on 2 lines */
  }
endif
}
```

1. Design a Lexical analyzer for the above language. The lexical analyzer should ignore redundant spaces, tabs and newlines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value.
2. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools.
3. Design Predictive parser for the given language
4. Design LALR bottom up parser for the above language.

5. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.
6. Write program to generate machine code from the abstract syntax tree generated by the parser. The following instruction set may be considered as target code.

The following is a simple register-based machine, supporting a total of 17 instructions. It has three distinct internal storage areas. The first is the set of 8 registers, used by the individual instructions as detailed below, the second is an area used for the storage of variables and the third is an area used for the storage of program. The instructions can be preceded by a label. This consists of an integer in the range 1 to 9999 and the label is followed by a colon to separate it from the rest of the instruction. The numerical label can be used as the argument to a jump instruction, as detailed below. In the description of the individual instructions below, instruction argument types are specified as follows:

**R**  
specifies a register in the form R0, R1, R2, R3, R4, R5, R6 or R7 (or r0, r1, etc.).

**L**  
specifies a numerical label (in the range 1 to 9999).

**V**  
specifies a "variable location" (a variable number, or a variable location pointed to by a register - see below).

**A**  
specifies a constant value, a variable location, a register or a variable location pointed to by a register (an indirect address). Constant values are specified as an integer value, optionally preceded by a minus sign, preceded by a # symbol. An indirect address is specified by an @ followed by a register. So, for example, an A-type argument could have the form 4 (variable number 4), #4 (the constant value 4), r4 (register 4) or @r4 (the contents of register 4 identifies the variable location to be accessed).

The instruction set is defined as follows:

- LOAD A,R**  
loads the integer value specified by A into register R.
- STORE R,V**  
stores the value in register R to variable V.
- OUT R**  
outputs the value in register R.
- NEG R**  
negates the value in register R.
- ADD A,R**

adds the value specified by A to register R, leaving the result in register R.

**SUB A,R**  
subtracts the value specified by A from register R, leaving the result in register R.

**MUL A,R**  
multiplies the value specified by A by register R, leaving the result in register R.

**DIV A,R**  
divides register R by the value specified by A, leaving the result in register R.

**JMP L**  
causes an unconditional jump to the instruction with the label L.

**JEQ R,L**  
jumps to the instruction with the label L if the value in register R is zero.

**JNE R,L**  
jumps to the instruction with the label L if the value in register R is not zero.

**JGE R,L**  
jumps to the instruction with the label L if the value in register R is greater than or equal to zero.

**JGT R,L**  
jumps to the instruction with the label L if the value in register R is greater than zero.

**JLE R,L**  
jumps to the instruction with the label L if the value in register R is less than or equal to zero.

**JLT R,L**  
jumps to the instruction with the label L if the value in register R is less than zero.

**NOP**  
is an instruction with no effect. It can be tagged by a label.

**STOP**  
stops execution of the machine. All programs should terminate by executing a STOP instruction.

### Computer Networks

1. Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials –  
CRC 12 , CRC 16 and CRC CCIP .

- graph.
- between nodes. Now obtain Routing table at each node using distance vector routing algorithm
3. Implement Dijkstra 's algorithm to compute the Shortest path thru a
  4. Take an example subnet graph with weights indicating delay
  5. Take an example subnet of hosts . Obtain broadcast tree for it.
  6. Take a 64 bit playing text and encrypt the same using DES algorithm
  7. Write a program to break the above DES coding
  8. Using RSA algorithm Encrypt a text data and Decrypt the same .

7. Simulate all page replacement algorithms  
a) FIFO b) LRU c) LFU Etc...
8. Simulate Paging Technique of memory management

#### Linux Internals:

1. Write a shell script tp generate a multiplication table.
2. Write a shell script that copies multiple files to a directory.
3. Write a shell script which counts the number of lines and words present in a given file.
4. Write a shell script which displays the list of all files in the given directory.
5. Write a shell script(small calculator) that adds, subtracts, multiplies and divides the given two integers. There are two division options: one returns the quotient and the other returns reminder. The script requires 3 arguments: The operation to be used and two integer numbers. The options are add(-a), subtract(-s), multiply(-m), quotient(-c) and reminder(-r).
6. Write a shell script to reverse the rows and columns of a matrix.
7. Write a C program that counts the number of blanks in a text file.
  - a) using standard I/O
  - b) using system calls.
8. Implement in C the following Unix commands using system calls.
  - a) cat
  - b) ls
  - c) mv
9. Write a program that takes one or more file/directory names as command line input and reports the following information on the file:
  - c) File type.
  - d) Number of links.
  - e) Time of last access.
  - f) Read, Write and Execute permissions.
10. Write a C program that illustrates how to execute two commands concurrently with a command pipe.
11. Write a C program that illustrates the creation of child process using fork system call.
12. Write a C program that displays the real time of a day every 60 seconds.
13. Write a C program that illustrates file locking using semaphores.
14. Write a C program that implements a producer-consumer system with two processes.(using semaphores)
15. Write a C program that illustrates inter process communication using shared memory system calls.
16. Write a C program that illustrates the following.
  - g) Creating a message queue.

### JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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#### OPERATING SYSTEMS & LINUX INTERNALS LAB

1. Simulate the following CPU scheduling algorithms  
a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies  
a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques  
a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention







The Socket API: The basic model. Stream-mode (connection-oriented) socket. Datagram socket (connectionless) socket.  
The Client-server Paradigm: Connection-oriented client-server. Connectionless client-server. Iterative server and concurrent server. Stateful server and stateless server.  
Group Communications: Unicast versus multicast. Basic model of group communications.  
Multicast and message ordering. Reliable multicast/broadcast.

#### **UNIT – III:**

Distributed objects.: Message passing versus distributed objects. The basic model.  
Remote procedure call. Remote method invocation.  
Advanced Remote Method Invocations (RMI): RMI stub downloading. security policy.  
Callback.

#### **UNIT-IV:**

Internet applications: Basic components and protocols: HTTP, HTML, MIME, web server, browser, web forms. Web document types: static, dynamic, executable, active.  
CGI: background; interaction and passing of data among browser, web server, and script(s). HTTP Session state information: hidden tags, cookies, session objects.  
Client-side programming: Applets, JavaScript. Server-side programming: common gateway Interface (CGI), servlets, server pages.

The Common Object Request Broker Architecture (CORBA): Basic architecture. Object Servers and Object Clients. Object References. Naming services. Object services. Object adapters. Java IDL.

#### **UNIT-V:**

Internet Applications : Applets. Servlets; session data maintenance. Web services and the Simple Object Access Protocol (SOAP).

Advanced Distributed Computing Paradigms: Message queue system. Mobile agents. Network services. Object spaces.

#### **TEXT BOOK:**

1.M.L.Liu, “ Distributed Computing – Concepts and Applications” , Addison-Wesley inc.

### **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

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#### **Department Elective -2 PARALLEL PROGRAMMING**

##### **UNIT-I:**

Introduction: Parallel Processing Architectures: Parallelism in sequential machines,  
Abstract model of parallel computer, Multiprocessor architecture, Pipelining, Array processors. Programmability Issues: An overview, Operating system support, Types of operating systems, Parallel programming models, Software tools

##### **UNIT-II**

Data Dependency Analysis: Types of dependencies loop and array dependences,  
Loop dependence analysis, Solving diophantine equations, Program transformations  
Shared Memory Programming: General model of shared memory programming,  
Process model under UNIX

### UNIT-III

Algorithms for Parallel Machines: Speedup, Complexity and cost, Histogram, computation, Parallel reduction, Quadrature problem, Matrix multiplication, Parallel sorting algorithms, Solving linear systems, Probabilistic algorithms, Message Passing Programming: Introduction, Model, Interface, Circuit satisfiability, Introducing collective, Benchmarking parallel performance  
Parallel Programming languages: Fortran90, nCUBE C, Occam, C-Linda

### UNIT-IV

Debugging Parallel Programs: Debugging techniques, Debugging message passing  
parallel programs, Debugging shared memory parallel programs, Memory and I/O Subsystems: Hierarchical memory structure, Virtual memory system, Memory allocation and management,

### UNIT-V

Cache allocation and management, Cache memories and management, Input output subsystems, Other Parallelism Paradigms: Data flow computing, Systolic architectures, Functional and logic paradigms, Distributed shared memory, Performance of Parallel Processors: Speedup and efficiency, Amdahl's law, Gustafson-Barsis's law, Karf-Flatt metric, Iso efficiency metric

#### Text Books:

1. Hawang Kai and Briggs F. A., "Computer Architecture and Parallel Processing", McGraw Hill
2. Jordan H. F. and Alaghaband G., "Fundamentals of Parallel Processing"
3. M.J. Quinn, "Parallel Programming", TMH

## NTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

L T P C  
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### Department Elective -2 SOFTWARE TESTING METHODOLOGIES

#### 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 dataflow testing, strategies in dataflow 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.

**REFERENCE BOOKS:**

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.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

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**NETWORK SECURITY**

**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, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

**UNIT-II:**

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC,

**UNIT-III:**

**Number Theory:** Modular Arithmetic, Euclid's Algorithm, Fermat's and Euler's Theorem, Chinese Remainder Theorem, Public key cryptography

principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

#### **UNIT-IV:**

Email privacy: Pretty Good Privacy (PGP) and S/MIME,.  
IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management  
Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)

#### **UNIT-V**

Intruders, Viruses and related threats  
Firewall Design principles, Trusted Systems  
Intrusion Detection Systems

#### **TEXT BOOKS:**

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permech, wiley Dreamtech,

#### **REFERENCE BOOKS:**

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
4. Principles of Information Security, Whitman, Thomson.
5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
6. Introduction to Cryptography, Buchmann, Springer.

### **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

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#### **Department Elective -3 ARTIFICIAL INTELLIGENCE**

#### **UNIT I**

##### **Introduction:**

AI problems, AI Technique, defining problem as a static space search production systems, problem characteristics, production system characteristics.

##### **Heuristic search Techniques:**

Generate – and – test, Hill climbing, best – first search, problem reduction, constraint satisfaction, means-ends analysis.

#### **UNIT II**

##### **Knowledge representation:**

Issues, predicate logic, resolution, representing Knowledge using rules, Forward versus Backward reasoning, Matching, control Knowledge, weak slot – and – filler structures, semantic nets, frames, strong slot – and – filler structures, conceptual dependency, scripts.

### UNIT III

#### Reasoning Techniques:

Nonmonotonic reasoning, Augmenting a problem solver, implementation of depth first search and Breadth first search, statistical reasoning, probability and Bayes theorem, certainty factors and rule-based systems, Bayesian networks.

### UNIT IV

#### Game Playing:

Minimax search, alpha – beta cutoffs, planning system, Goal stack planning, hierarchical planning, understanding, understanding as constraint satisfaction, waltz algorithm, natural language processing, syntactic processing, Augmented transition Networks, Semantic analysis, case grammars.

### UNIT V

#### Learning:

Rote learning, learning by taking advice, learning in problem solving, learning from examples, Winston's learning program, Decision trees, perception, vision, speech recognition, Navigation, manipulation, Robot architectures, Expert systems, shell, explanation, knowledge acquisition.

#### TEXT BOOK:

Artificial Intelligence" 2<sup>nd</sup> Edn. , E.Rich and K.Knight (TMH)

#### REFERENCE BOOKS:

1. Artificial Intelligence – A modern Approach, second edition, Stuart Russell, Peter Norvig , PHI/ Pearson Education.
2. Artificial Intelligence, and Expert systems – Patterson PHI

### JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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#### Department Elective -3 COMPUTER GRAPHICS

#### UNIT-I:

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

**Output primitives:** Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms

#### UNIT-II:

**2-D geometrical transforms:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

**2-D viewing :** The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions,

Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm

#### UNIT-III:

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

**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-IV:

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

#### UNIT-V:

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

#### 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.

#### REFERENCE BOOKS:

1. Computer Graphics", second Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.
2. Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc-Graw hill edition.
3. rocedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2<sup>nd</sup> edition.
4. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.

6. Computer Graphics, Steven Harrington, TMH

### JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

L T P C  
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#### Department Elective -3 NETWORK MANAGEMENT SYSTEMS

#### UNIT-I:

**Data communications and Network Management Overview:** Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

#### UNIT-II:

**SNMPV1 Network Management:** Organization and Information and Information Models.

**Managed network:** Case Histories and Examples, The SNMP Model, The Organization Model, System Overview, The Information Model.

**SNMPv1 Network Management:** Communication and Functional Models



The SNMP Communication Model, Functional model

### UNIT-III

**SNMP Management: SNMPv2** :Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility With SNMPv1

**SNMP Management: RMON:**What is Remote Monitoring? , RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON

### UNIT-IV:

**Telecommunications Management Network:**Why TMN? , Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated View of TMN, Implementation Issues.

**Network Management Tools and Systems:**Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial Network management Systems, System Management, Enterprise Management Solutions.

### UNIT-V:

**Web-Based Management:**NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management, WBEM: Windows Management Instrumentation, Java management Extensions, Management of a Storage Area Network: , Future Directions

### TEXT BOOKS:

1. Network Management, Principles and Practice, Mani Subrahmanian, Pearson Education.

### Reference Books

1. Network management, Morris, Pearson Education.
2. Principles of Network System Administration, Mark Burges, Wiley Dreamtech.
3. Distributed Network Management, Paul, John Wiley.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

L T P C  
4 0 0 4

### Department Elective -3

### MULTIMEDIA APPLICATION DEVELOPMENT

#### UNIT-I

Fundamental concepts in Text and Image: Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

#### UNIT-II

**Action Script I:** ActionScript Features, Object-Oriented ActionScript, Datatypes and Type Checking, Classes, Authoring an ActionScript Class, Inheritance, Authoring an ActionScript 2.0 Subclass, Interfaces, Packages, Exceptions, An OOP Application Frame work, Using Components with ActionScript MovieClip Subclasses.

### UNIT III

**Programming:** Abstraction levels: Device Drivers, System software, frame works and libraries, application generators. Requirements for programming languages: very large data volumes, real time requirements, synchronization, reusability, expandability, maintainability, robustness. Object-Oriented application development: Basic terms of the object model, object model properties. Object-oriented Frame works and class libraries: data type modeling, modeling data streams, Distribution of Objects: Example: PMG and CORBA, Example: Digital audio video council (DAVIC), DSM-CC.

### UNIT IV

Design: Design specific properties of images. Visualizations: objective visualization, Abstract visualization, producing visualization, Good and bad visualization. Symbols: logos, icons, and pictograms. Illustrations. Image Production Techniques. Typography: layout. Esthetics.

### UNIT-V

User Interfaces: Example: Remote controlled video camera. Usability: Goals of Usability, Solving usability problems. Direct Manipulations: Characteristics of Direct Manipulation, Forms of Directness, Discussion of Direct manipulation. Guidelines for User-friendly user interfaces. GUI and the audio medium. Innovative forms of interaction: Virtual Reality, computer-augmented reality.

#### Text Books:

- 1) Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew  
PHI/Pearson Education
- 2) Essentials ActionScript 2.0, Colin Moock, SPD O, REILLY.
- 3) Multimedia Applications, Steinmetz, Nahrstedt, Springer.

#### Reference Books:

1. Digital Multimedia, Nigel Chapman and Jenny Chapman, Wiley-Dreamtech
2. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
3. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press)
4. Multimedia Basics by Weixel Thomson

5. Multimedia Technology and Applications, David Hilman, Galgotia
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## JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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### WEB TECHNOLOGIES

#### UNIT-I:

**HTML Common tags-** List, Tables, images, forms, Frames; Cascading Style sheets;  
**XML:** Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

#### UNIT-II:

Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script  
**Java Beans:** Introduction to Java Beans, Advantages of Java Beans, BDK, Introspection, Using Bound properties, Bean Info Interface, Constrained properties, Persistence, Customizes, Java Beans API.

#### UNIT-III:

**Web Servers:** Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servelet Package, Reading Servlet 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 Servlet. The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC Setting Up and JSP Environment, 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 Data 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. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, WILEY Dreamtech (UNIT s 1,2 ,3)
2. The complete Reference Java 2 Fifth Edition by Patrick Naughton and Herbert Schildt. TMH (Chapters: 19, 20, 21, 22, 25, 27) (UNIT 4)
3. Java Server Pages –Hans Bergsten, SPD O’Reilly (UNITs 5,6,7,8)

#### **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, 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 Programmimg-Bai/Ekedaw-Thomas
9. Beginning Web Programming-Jon Duckett WROX.
10. Java Server Pages, Pekowsky, Pearson.

### **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

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#### **Open Elective -2 RESEARCH METHODOLOGIES**

##### **Unit- I :**

Introduction, Meaning, aim, nature and scope of research, Characteristics and Prerequisites of research, Research needs in Engineering, Education, Science and Management.  
Research benefits to Society in general.

##### **Unit- II :**

Review of Literature, Role of Review, Search for related literature, On line search, Searching Web, Conducting a literature search, Evaluating, Organizing, and synthesizing the literature.

##### **Unit- III :**

Research Problem Statement and Purpose of Research, Identifying and describing the research , Finding the research Problem, Sources of research problem, Criteria/ Characteristics of a Good research.

Planning for Research Design, The Nature and role of Data in Research, Linking Data and Research Methodology, Validity of Method, Planning for Data collection, Choosing a Research Approach, Use of Quantitative / Qualitative Research Design, Feasibility of Research Design, Establishing Research Criteria, Justification of Research Methodology.

#### **Unit – IV :**

Research Proposal preparation, Characteristics of a proposal, Formatting a research proposal, Preparation of proposal, Importance of Interpretation of data and treatment of data.

Statistical Techniques for Quantitative Data, Exploring the data, Discription and Analysis of Data, Role of Statistics for Data Analysis, Functions of Statistics, Estimates of Population Parameters, Parametric V/s Non Parametric methods, Descriptive Statistics, Points of Central tendency, Measures of Variability, Measures of relationship, Inferential Statistics- Estimation, Hypothesis Testing, Use of Statistical software,

**Unit- V :** Research Report, Format of the Research report, Style of writing report, References and Bibliography.

#### **REFERENCES :**

1. Practical Research : planning and Design( 8th Edition) – Paul D. Leedy and Jeanne E. Ormrod.
2. www. Prenhall.com/leedy.
3. A Hand Book of Education Research – NCTE
4. Methodogy of Education Research – K.S. Sidhu.
5. Research Methodology. Methods & Technique : Kothari. C.R.
6. Tests, Measurements and Research methods in Behavioural Sciences- A.K. Singh.
7. Statistical Methods- Y.P. Agarwal.
8. Methods of Statistical Ananalysis- P.S Grewal.
9. Fundamentals of Statistics – S.C. Gupta, V.K. Kapoor.

### **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

**L T P C**  
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#### **Open Elective -2** **DIGITAL SIGNAL PROCESSING**

**UNIT - 1 : SIGNALS AND SYSTEMS** Basic elements of digital signal Processing -Concept of frequency in continuous time and discrete time signals -Sampling theorem -Discrete time signals. Discrete time systems -Analysis of Linear time invariant systems -Z transform -Convolution and correlation.

**UNIT - 2 : FAST FOURIER TRANSFORMS** Introduction to DFT - Efficient computation of DFT Properties of DFT - FFT algorithms - Radix-2 and Radix-4 FFT algorithms - Decimation in Time - Decimation in Frequency algorithms - Use of FFT algorithms in Linear Filtering and correlation.

**UNIT - 3 : IIR FILTER DESIGN** Structure of IIR - System Design of Discrete time IIR filter from continuous time filter - IIR filter design by Impulse Invariance. Bilinear transformation - Approximation derivatives - Design of IIR filter in the Frequency domain.

**UNIT - 4 : FIR FILTER DESIGN** Symmetric & Antisymmetric FIR filters - Linear phase filter - Windowing technique - Rectangular, Kaiser windows - Frequency sampling techniques - Structure for FIR systems.

**UNIT - 5 : FINITE WORD LENGTH EFFECTS** Quantization noise - derivation for quantization noise power - Fixed point and binary floating point number representation - comparison - over flow error - truncation error - co-efficient quantization error - limit cycle oscillation - signal scaling - analytical model of sample and hold operations - Application of DSP - Model of Speech Wave Form - Vocoder.

**TEXT BOOKS**

1. John G Proakis and Dimtris G Manolakis, "Digital Signal Processing Principles, Algorithms and Application", PHI/Pearson Education, 2000, 3rd Edition.

**REFERENCES**

1. Alan V Oppenheim, Ronald W Schafer and John R Buck, "Discrete Time Signal Processing", PHI/Pearson Education, 2000, 2nd Edition.  
 2. Johnny R.Johnson, "Introduction to Digital Signal Processing", Prentice Hall of India/Pearson Education, 2002.  
 3. Sanjit K.Mitra, "Digital Signal Processing: A Computer - Based Approach", Tata McGraw-Hill, 2001, Second Edition.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

<b>III Year IDP (B.Tech. CSE &amp; M.Tech./MBA) II-Sem</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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**Open Elective -2  
VLSI**

**UNIT I**

**COMPONENTS OF VLSI:-** Components of VLSI circuits- Fundamental features (Switching delay, power consumption, scaling, yield estimation) - Time-area complexity (Lower bounds, communication complexity and crossing sequence)

**UNIT II**

**VLSI SYSTEM DESIGN:-** Overview of VLSI system design (Y-chart and optimizations, hierarchical design) Physical design-Logic synthesis-- High-level synthesis-System On a Chip (SOC)Design methodology.

**UNIT III**

**INTRODUCTION TO EMBEDDED SYSTEM:-** Introduction-Processor and Memory Organization-Devices and Buses for Device Networks- Device Drivers and Interrupt Servicing Mechanisms

**UNIT IV**

**EMBEDDED PROGRAMMING:-** Programming concepts-Embedded Programming in C and C++-Embedded Programming in JAVA-Real Time Operating System Programming Tools.-Micro C/OS-II and VxWorks.

**UNIT V**

**CASE STUDIES OF PROGRAMMING WITH RTOS:-** Coding for an Automatic Chocolate Vending Machine-Coding for Sending an Application Layer Byte on a TCP/IP Network -Embedded System for an Adaptive Cruise Control System in a Car-Embedded System for a Smart Card

**TEXT BOOKS**

1. 1. W.Wolf ,” *Modern VLSI Design: Systems on Silicon* ”Second Edition, Prentice Hall 1998, ISBN:0-011076-0  
 2. Raj Kamal “*Embedded Systems-Architecture, Programming and Design*: Tata McGraw-Hill, Eleventh Reprint ,2007.

**REFERENCE BOOKS**

1. Douglas A. Pucknell and Kamran Eshraghian, "*Basic VLSI Design*" Prentice Hall,1995  
 2. Eugene D. Fabricius, . "*Introduction to VLSI Design*" Tata- Mcgraw-Hill . ,1990  
 3. Frank Vahid and Tony Givargis"*Embedded System Design: A Unified Hardware/Software Introduction*" John Wiley & Sons,ISBN:0471386782,2001

controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories.

**UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9:-** Engineering as Experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law – the challenger case study

**UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9:-**Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and chernobyl case studies. Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) - discrimination.

**UNIT V GLOBAL ISSUES 8:-** Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE),India, etc. TOTAL : 45

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem	L	T	P	C
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### Open Elective -2 PROFESSIONAL ETHICS

**UNIT I: HUMAN VALUES 10:-** Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality

**UNIT II ENGINEERING ETHICS 9:-** Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and

### TEXT BOOK

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

### REFERENCES

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint)
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
3. Create and save an XML document at 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.
  - b. Create two Beans-a)KeyPad .b)DisplayPad .After that integrate the two Beans to make it work as a Calculator.
  - c. 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.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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**WEB TECHNOLOGIES LAB**

1. Develop static pages (using Only HTML) of an online Book store. The pages should resemble: [www.amazon.com](http://www.amazon.com) The website should consist the following pages.

- Home page
2. Registration and user Login
3. User Profile Page
4. Books catalog
5. Shopping Cart
6. Payment By credit card
7. Order Conformation

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.
7. Implement the “Hello World!” program using JSP Struts Framework.

4. Data Modeling. Use work products - Data dictionary, Use diagrams and activity diagrams, build and test class diagrams, Sequence diagrams and add interface to class diagrams.
5. Software Development and Debugging
6. Software Testing. Prepare test plan, perform validation testing, Coverage analysis, memory leaks, develop test case hierarchy, Site check and Site monitor.

#### **SUGGESTED LIST OF APPLICATIONS**

1. Student Marks Analyzing System
2. Quiz System
3. Online Ticket Reservation System
4. Payroll System
5. Course Registration System
6. Expert Systems
7. ATM Systems
8. Stock Maintenance
9. Real-Time Scheduler
10. Remote Procedure Call Implementation

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III Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem      L T P C  
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#### **OBJECT ORIENTED ANALYSIS AND DESIGN LAB**

##### **LIST OF EXPERIMENTS**

1. Prepare the following documents for two or three of the experiments listed below and develop the software engineering methodology.
2. Program Analysis and Project Planning. Thorough study of the problem - Identify project scope, Objectives, Infrastructure.
3. Software requirement Analysis. Describe the individual Phases / Modules of the project, Identify deliverables.

#### **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem      L T P C  
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#### **Department Elective-4**

#### **WEB SERVICES & SERVICE ORIENTED ARCHITECTURE**

##### **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 Services 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, developing web services enabled applications.

**Describing Web Services** – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

## UNIT III

**Core fundamentals of SOAP** – SOAP Message Structure, SOAP encoding, SOAP message exchange models, SOAP communication and messaging, SOAP security.

**Developing Web Services using SOAP** – Building SOAP Web Services, developing SOAP Web Services using Java, limitations of SOAP.

## UNIT IV

**Discovering Web Services** – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI Registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, support for categorization in UDDI Registries, Publishing API, Publishing information to a UDDI Registry, searching information in a UDDI Registry, deleting information in a UDDI Registry, limitations of UDDI.

## UNIT V

**Web Services Interoperability** – Means of ensuring Interoperability, Overview of .NET and J2EE.

**Web Services Security** – XML security frame work, XML encryption, XML digital signature, XKMS structure, guidelines for signing XML documents.

### Text Books:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.
2. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education.
3. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.

### Reference Books :

1. Building Web Services with Java, 2<sup>nd</sup> Edition, S. Graham and others, Pearson Education.
2. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.
4. J2EE Web Services, Richard Monson-Haefel, Pearson Education.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### Department Elective-4

### BIO-INFORMATICS

#### UNIT I

**INTRODUCTION:-** Definition – Overview- Major databases in Bio Informatics- Molecular biology – Central Dogma- Data retrieval tools – Data mining of Databases – Gene Analysis – Prokaryotic and Eukaryotic Genomes – Sequence Assembly – Gene mapping – Physical maps – cloning – ORF – amino acids – DNA, RNA sequences – Genetic code.

#### UNIT II

**DNA and PROTEIN SEQUENCES:-**DNA: working with single DNA sequence : removing vector sequences- verifying restriction maps – PCR design – GC content – counting words – internal repeats – protein coding regions – ORFing – Genomescan Protein: predicting properties – primary structure analysis – transmembrane segments – PROSITE patterns – interpreting scanprosite results- finding domains – CD server results – pfscan results.

### UNIT III

**ALIGNMENT OF PAIR OF SEQUENCES:-** Terminology – Global and Local alignment – Dot matrix – dynamic programming – using scoring matrices –PAM matrices – BLOSUM.Working with FASTA – Algorithm – output – E-values – Histogram. Working with BLAST – algorithm – output – services – gapped BLAST- PSIBLAST – comparison of FASTA and BLAST.

### UNIT IV

**MULTIPLE SEQUENCE ALIGNMENT:-** Criteria for Multiple sequence alignment – applications – choosing the right sequences; FASTA, ClustalW, TCOFFEE methods – interpreting multiple sequence alignment – getting in right format – converting formats –using Jalview – preparing for publication.

### UNIT V

**PROTEIN CLASSIFICATION & STRUCTURE PREDICTION:-** Structure of amino acids – primary structure – secondary structure – folds and motifs – alpha and beta helix –structure based protein classification – protein structure Data bases – folding problem – PROSEARCH – primary structure analysis and prediction – secondary structure analysis and prediction – motifs – profiles –patterns and fingerprints

### TEXT BOOKS

1. S.C Rostogi , Mendiratta, P.Rasogi, “ *Bioinformatics: methods and applications*”,second edition, PHI 2006.
2. Jean Mickel Clavere & Cadrienotredom “*Bio Informatics– A beginners guide*” Wiley DreamTech, 2003.

### REFERENCE BOOKS

1. T.K. Attwood and D.J Perry Smith, “ *Introduction to Bio Informatics*”, Pearson Education, 1<sup>st</sup> Edition, 2001.
2. Dan E.Krane, Michael L.Raymer, “*fundamental concepts of Bioinformatics* “, Pearson Education, 2004.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### Department Elective-4

### INFORMATION RETRIEVAL SYSTEMS

#### UNIT-I

Definition ,objectives, functional overview , Relationship to DBMS, Digital libraries, Datawarehouses. Information Retrieval System Capabilities: Search , browse, Miscellaneous[1]

#### Unit –II:

Retrieval strategies: vector space model, probabilistic retrieval strategies, extended Boolean retrieval, LSI, fuzzy set Retrieval,[2]

Cross language information retrieval: Introduction, cross language barrier, Cross –language Retrieval strategies, Cross language utilities, [2]

**Unit -III:**

Efficiency: Inverted Index, Query processing, Signature files, Duplicate document Detection[2]

Integrated structured data and text: IR as a relational application, semi structured search using a relational scheme, multi-dimensional data model, mediators[2]

**Unit IV:**

Text Search Algorithms: Introduction, software Text search algorithms, Hardware Text search algorithms[1]

**Unit V:**

Multi-media information retrieval:Spoken language audio retrieval, Non-speech audio retrieval, graph retrieval, image retrieval, video retrieval [1]

Parallel information retrieval: Text Scanning, indexing, clustering and classification, [2]

Distributed information retrieval: A theoretical model of Distributed retrieval, Result fusion , [2]

**Text books:**

[1] Information storage and retrieval systems: Theory and implementation II<sup>nd</sup> edition: springer publishers,Gerald J.Kowalski mark T.Maybury

[2] Information Retrieval : algorithms and heuristics II<sup>nd</sup> edition, springer publishers. David A . Grossman ,Ophir frieder.

**References:**

[1] Information Retrieval systems: Yates personed education  
[2] Modern information retrieval ; frakes pearsoned education.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem**

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**Department Elective-4**

**NATURAL LANGUAGE PROCESSING**

**UNIT - I : INTRODUCTION**

Introduction: Knowledge in speech and language processing - Ambiguity - Models and Algorithms - Language, Thought and Understanding. Regular Expressions and automata: Regular expressions - Finite-State automata. Morphology and Finite-State Transducers: Survey of English morphology - Finite-State Morphological parsing - Combining FST lexicon

and rules - Lexicon-Free FSTs: The porter stammer - Human morphological processing.

## **UNIT - II : SYNTAX**

Word classes and part-of-speech tagging: English word classes - Tagsets for English - Part-of-speech tagging - Rule-based part-of-speech tagging - Stochastic part-of-speech tagging - Transformation-based tagging - Other issues. Context-Free Grammars for English: Constituency - Context-Free rules and trees - Sentence-level constructions - The noun phrase - Coordination - Agreement - The verb phrase and sub categorization - Auxiliaries - Spoken language syntax - Grammars equivalence and normal form - Finite-State and Context-Free grammars - Grammars and human processing. Parsing with Context-Free Grammars: Parsing as search - A Basic Top-Down parser - Problems with the basic Top-Down parser - The early algorithm - Finite-State parsing methods.

## **UNIT - III : ADVANCED FEATURES AND SYNTAX**

Features and Unification: Feature structures - Unification of feature structures - Features structures in the grammar - Implementing unification - Parsing with unification constraints - Types and Inheritance. Lexicalized and Probabilistic Parsing: Probabilistic context-free grammar - problems with PCFGs - Probabilistic lexicalized CFGs - Dependency Grammars - Human parsing.

## **UNIT - IV : SEMANTIC**

Representing Meaning: Computational desiderata for representations - Meaning structure of language - First order predicate calculus - Some linguistically relevant concepts - Related representational approaches - Alternative approaches to meaning. Semantic Analysis: Syntax-Driven semantic analysis - Attachments for a fragment of English - Integrating semantic analysis into the early parser - Idioms and compositionality - Robust semantic analysis. Lexical semantics: relational among lexemes and their senses - WordNet: A database of lexical relations - The Internal structure of words - Creativity and the lexicon.

## **UNIT - V : APPLICATIONS**

Word Sense Disambiguation and Information Retrieval: Selectional restriction-based disambiguation - Robust word sense disambiguation - Information retrieval - other information retrieval tasks. Natural Language Generation: Introduction to language generation - Architecture for generation - Surface realization - Discourse planning - Other issues. Machine Translation: Language similarities and differences - The transfer

metaphor - The interlingua idea: Using meaning - Direct translation - Using statistical techniques - Usability and system development.

## **TEXT BOOKS**

1. Daniel Jurafsky & James H.Martin, " Speech and Language Processing", Pearson Education (Singapore) Pte. Ltd., 2002.

## **REFERENCES**

1. James Allen, "Natural Language Understanding", Pearson Education, 2003.

## **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem**

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## **DISTRIBUTED SYSTEMS**

### **UNIT I**

Characterization of Distributed Systems. Design Issues, User Requirement, Network Technologies and Protocols, IPC, Client-Server Communication, Group Communication, IPC in UNIX. Remote Procedure Calling, Design issues, Implementation, Asynchronous RPC

### **UNIT II**

Distributed OS, Its kernel, Processes and Threads, Naming and Protection, Communication and Invocation, Virtual Memory, File Service components, Design issues, Interfaces, implementation techniques, SUN network file systems

### UNIT III

SNS – a name service model, its design issues, Synchronizing physical clocks, Logical time and logical clocks, Distributed coordination. Replication and its architectural model, Consistency and request ordering, Conversation between a client and a server, Transactions, Nested Transactions.

### UNIT IV

**Concurrency control** Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

**Distributed Transactions** and Nested Transactions, Atomic commit protocols, Concurrency control in distributed transactions, distributed Deadlocks, Transactions with replicated data, Transaction recovery, Fault tolerance, Hierarchical and group masking of faults.

### UNIT V

**Cryptography**, Authentication and key distribution, Logics of Authentication, Digital signatures.

**Distributed shared memory**, Design and Implementation issues, Sequential consistency and ivy, Release consistency and Munin, Overview of Distributed Operating systems Mach, Chorus.

### Text Books:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Third Edition, Pearson Education.

### Reference Books

1. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
2. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.

## NTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### PG ELECTIVE-1

### High Speed Networks

### UNIT I

#### Switching and Data Transmission

ISO-OSI reference model. TCP/IP reference model, Circuit-switched networks, Datagram networks, Virtual-circuit networks, Structure of a switch, Telephone network, Dial-up modems, Digital Subscriber line, Cable TV networks

#### Data Link Layer

**Error Detection and Correction:** Introduction, Block coding, Linear Block codes, Cyclic codes, Checksum - **Data Link Control:** Framing,

Flow and Error control, Protocols, Noiseless channels, Noisy channels, HDLC, Point-to-Point Protocol

## UNIT II

**Multiple Access:** Random Access, Controlled Access, Channelization – **Connecting Devices:** Connecting LANs, Backbone Networks, Virtual LANs.

### High Speed Networks

**Frame Relay:** Packet-Switching Networks, Frame Relay Networks – **Asynchronous Transfer Mode (ATM) :** ATM Protocol Architecture, ATM Logical Connections, ATM Cells, ATM Service Categories, ATM Adaptation Layer (AAL)- **High-Speed LANs :** The Emergence of High-Speed LANs, Ethernet, Fiber Channel, Wireless LANs.

## UNIT III

### Network Layer

**Logical Addressing:** IPv4 Addresses, IPv6 Addresses, - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 - **Network Delivery - Routing:** Forwarding, Unicast Routing Protocols, Multicast Routing Protocols

### Transport Layer and Application Layer

**Protocols:** Process-to-Process delivery, User Datagram Protocol (UDP), TCP, SCTP -**Congestion control:** Data traffic, Congestion, Congestion control, Quality of Service

## UNIT IV

**Domain Name System:** Name space, Domain Name Space, Distribution of Name Space, DNS in the internet, Resolution, DNS messages, E-mail **Needs and Goals for Network Design**

**Analyzing Business Goals and Constraints: Using** a Top-Down Network Design Constraints, Analyzing Business Goals, Analyzing Business constraints – **Analyzing Technical Goals & Tradeoffs:** Scalability, Availability, Network Performance, Security, Manageability, Usability, Adaptability, Affordability, Making Network Design Tradeoffs – **Characterizing Network Traffic:** Characterizing Traffic Flow, Traffic Load, Traffic Behavior, Quality of Service Requirements

## UNIT V

### Logical Network Design

**Designing Network Design:** Hierarchical Network Design, Redundant Network Design Topologies, Modular Network Design, Designing a Campus Network Design Topology, Designing the Enterprise Edge Topology, Secure Network Design Topologies

**Designing Models for Addressing and Naming:** Guidelines for Assigning Network Layer Addresses, Using a Hierarchical Model for Assigning Addresses, Designing a Model for Naming.

### Selecting Switching and Routing Protocols

Selecting Bridging & Switching Protocols, Spanning Tree Protocol Enhancements - **Selecting Routing Protocols:** Characterizing Routing protocols, IP Routing, Novell NetWare Routing, Using Multiple Routing Protocols in an Internet work

### Text Books:

1. Data Communications and Networking, *Behrouz A. Forouzan*, Fourth Edition, Tata McGraw Hill
2. High Speed Networks and Internets – Performance and Quality of Service, *William Stallings*, Second Edition, Pearson Education.
3. Top-Down Network Design, *Priscilla Oppenheimer*, Second Edition, Pearson Education (CISCO Press)

### Reference Books:

1. Guide to Networking Essentials, *Greg Tomsho, Ed Tittel, David Johnson*, Fifth Edition, Thomson.
2. Computer Networks, *Andrew S. Tanenbaum*, Fourth Edition, Prentice Hall.
3. An Engineering Approach to Computer Networking , *S.Keshav*, Pearson Education.
4. Campus Network Design Fundamentals, *Diane Teare, Catherine Paquet*, Pearson Education (CISCO Press)
5. Computer Communications Networks, *Mir*, Pearson Education.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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### PG ELECTIVE-1 NEURAL NETWORKS

#### UNIT-I

##### INTRODUCTION

Definition of ANN-Biological Neural Networks-Applications of ANN- Typical Architectures-Setting the weights-Common Activation functions- Development Of Neural Networks-McCulloch-Pitts Neuron

#### UNIT-II

## **SIMPLE NEURAL NETS FOR PATTERN CLASSIFICATION**

General discussion - Hebb net – Perceptron- Adaline - Backpropagation neural net- Architecture- Algorithm- Applications

## **UNIT-III**

### **PATTERN ASSOCIATION**

Training Algorithm for Pattern Association-Heteroassociative memory neural network-Autoassociative net-Iterative Autoassociative net-Bidirectional Associative Memory

## **UNIT-IV**

### **NEURAL NETS BASED ON COMPETITION**

Fixed Weights Competitive Nets- Kohonen's Self-Organizing Map – Learning Vector Quantization-Counter Propagation Network.

## **UNIT-V**

### **ADAPTIVE RESONANCE THEORY AND NEOCOGNITRON**

Motivation – Basic Architecture- Basic Operation-ART1-ART2- Architecture-Algorithm-applications-Analysis- Probabilistic Neural Net-Cascade Correlation-Neocognitron: Architecture—Algorithm.

## **TEXT BOOK**

1. Laurene Fausett, "*Fundamentals Of Neural Networks- Architectures, Algorithms and Applications*", Pearson Education, 2004.

## **REFERENCE BOOKS**

1. James. A.Freeman and David.M.Skapura, "*Neural Networks Algorithms, Applications and Programming Techniques* " ,Pearson Education , 2002.
2. B.Yegnanarayana, "*Artificial Neural Networks*",Prentice - Hall, of India, 2001.
3. Simon Haykin, "*Neural Networks - A Comprehensive Foundation*", Pearson Education – 2001.
4. L.O.Chua , T.Roska, "*Cellular Neural Networks and Visual computing- Foundations and Applications*", Cambridge University Press, 2002
5. D.J.Mackay, "*Information Theory, Inference and Learning Algorithms*", Cambridge University Press,

## **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem**

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### **PG ELECTIVE-1**

### **SEMANTIC WEB**

#### **Unit I:**

Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web,The Next Generation Web

#### **Unit II:**

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

**Unit III:**

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL),UML,XML/XML Schema.

**Unit IV:**

Ontology Engineering,Constructing Ontology,Ontology Development Tools,Ontology Methods,Ontology Sharing and Merging,Ontology Libraries and Ontology Mapping,

**Unit V**

Logic,Rule and Inference Engines. Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base

XML Based Web Services, Creating an OWL-S Ontology for Web Services,Semantic Search Technology,Web Search Agents and Semantic Methods,

**TEXT BOOKS:**

1. Thinking on the Web - Berners Lee,Godel and Turing,Wiley interscience,2008.

**REFERENCE BOOKS:**

1. Semantic Web Technologies ,Trends and Research in Ontology Based Systems, J.Davies,Rudi Studer,Paul Warren, JohnWiley& Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web,T.Segaran, C.Evans, J.Taylor, O'Reilly,SPD.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem**

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**SOFTWARE ARCHITECTURES AND DESIGN PATTERNS**

**UNIT I**

Envisioning Architecture

The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views.

Creating an Architecture



Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

#### **UNIT II**

Analyzing Architectures

Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

#### **UNIT III**

Moving from one system to many

Software Product Lines, Building systems from off the shelf components, Software architecture in future.

#### **UNIT IV**

Patterns

Pattern Description, Organizing catalogs, role in solving design problems ,Selection and usage.

Creational and Structural patterns

Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight, Proxy.

#### **UNIT V**

Behavioral patterns

Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor.

Case Studies

A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control – a case study in designing for high availability, Celsius Tech – a case study in product line development

#### **Text Books:**

1. Software Architecture in Practice, second edition, Len Bass,Paul Clements&Rick Kazman, Pearson Education,2003.
2. Design Patterns, Erich Gamma, Pearson Education, 1995.

#### **Reference Books:**

1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR, 2001
3. Software Design, David Budgen, second edition, Pearson education,2003
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.

5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006
6. J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.
7. Design Patterns in C#, Steven John metsker, Pearson education, 2004.

### **JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem**

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#### **ADVANCED ALGORITHMS**

##### **UNIT - I :**

**Introduction:** Role of Algorithms in computing, Order Notation, Recurrences, Probabilistic Analysis and Randomized Algorithms. Sorting and Order Statistics: Heapsort, Quicksort and Sorting in Linear Time.

**Advanced Design and Analysis Techniques:** Dynamic Programming- Matrix chain Multiplication, Longest common Subsequence and optimal binary Search trees.

**UNIT - II :**

**Greedy Algorithms** - Huffman Codes, Activity Selection Problem. Amortized Analysis.

**Graph Algorithms:** Topological Sorting, Minimum Spanning trees, Single Source Shortest Paths, Maximum Flow algorithms..

**UNIT - III :**

**Sorting Networks:** Comparison Networks, Zero-one principle, bitonic Sorting Networks, Merging Network, Sorting Network.

**Matrix Operations-** Strassen's Matrix Multiplication, Inverting matrices, Solving system of linear Equations

**UNIT - IV :**

**String Matching:** Naive String Matching, Rabin-Karp algorithm, matching with finite Automata, Knuth- Morris - Pratt algorithm.

**UNIT- V :**

**NP-Completeness and Approximation Algorithms:** Polynomial time, polynomial time verification, NP-Completeness and reducibility, NP-Complete problems. Approximation Algorithms- Vertex cover Problem, Travelling Sales person problem

**TEXT BOOK:**

1. Introduction to Algorithms," T.H. Cormen, C.E. Leiserson ,R.L. Rivest, and C. Stein, Third Edition, PHI.

**REFERENCES:**

1. Fundamentals of Computer Algorithms, Ellis Horowitz,Satraj Sahni and Rajasekharam,Galgotia publications pvt. Ltd.
2. Design and Analysis Algorithms - Parag Himanshu Dave, Himanshu Bhalchandra Dave Publisher: Pearson
3. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia,John wiley and sons.
4. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem**

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**ADVANCED ALGORITHMS LAB**

English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

## 2. Objectives:

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

## 3. Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

- **Functional English** - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations, Discourse Skills.
- **Vocabulary Building** – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases, Collocations.
- **Reading Comprehension** – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.
- **Writing Skills** – structure and presentation of different types of writing – *Resume writing* /

### JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem	L	T	P	C
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### ADVANCED ENGLISH LANGUAGE COMMUNICATIONS LAB

#### 1. Introduction

The introduction of the English Language Lab is considered essential at 3<sup>rd</sup> year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in

*e-correspondence/Technical report writing/Portfolio writing – planning for writing – research abilities/data collection/organizing data/tools/analysis – improving one's writing.*

- **Group Discussion** – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- **Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/projects/reports/PPTs/e-mails/assignments etc.
- **Interview Skills** – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

#### 4. Minimum Requirement:

**The English Language Lab shall have two parts:**

- i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

#### **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

#### 5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

#### **Suggested Software:**

- **Clarity Pronunciation Power** – part II
- **Oxford Advanced Learner's Compass**, 7<sup>th</sup> 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)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed,**
  - **Positive Thinking,**
  - **Interviewing Skills,**
  - **Telephone Skills,**
  - **Time Management**
  - **Team Building,**
  - **Decision making**
- **English in Mind**, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

#### 6. Books Recommended:

1. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. **Advanced Communication Skills Laboratory Manual** by Sudha Rani, D, Pearson Education 2011.
3. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
4. **English Vocabulary in Use** series, Cambridge University Press 2008.
5. **Management Shapers Series** by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. **Communication Skills** by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
7. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. **Job Hunting** by Colm Downes, Cambridge University Press 2008.
9. **Master Public Speaking** by Anne Nicholls, JAICO Publishing House, 2006.
10. **English for Technical Communication for Engineering Students, Aysa Vishwamohan, Tata Mc Graw-Hil 2009.**
11. **Books on TOEFL/GRE/GMAT/CAT/ IELTS** by Barron's/DELTA/Cambridge University Press.
12. **International English for Call Centres** by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

**DISTRIBUTION AND WEIGHTAGE OF MARKS:**

**Advanced Communication Skills Lab Practicals:**

1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The 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.

**NETWORK PROGRAMMING**

**UNIT-I**

**Introduction to Network Programming:** OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

**Sockets :** Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

**UNIT-II**

**TCP client server :** Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

**Elementary UDP sockets:** Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

**I/O Multiplexing:** I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server,

**UNIT-III**

**socket options** getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

**Advanced I/O Functions-**Introduction, Socket Timeouts, recv and send Functions,readv and writev Functions, recvmsg and sendmsg Functions, Ancillary Data, How Much Data Is Queued?, Sockets and Standard I/O, T/TCP: TCP for Transactions

**UNIT-IV**

**Elementary name and Address conversions:** DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

**Daemon Processes and inetd Superserver** – Introduction, syslogd Daemon, syslog Function, daemon\_init Function, inetd Daemon, daemon\_inetd Function

**Broadcasting-** Introduction, Broadcast Addresses, Unicast versus Broadcast, dg\_cli Function Using Broadcasting, Race Conditions

**Multicasting-** Introduction, Multicast Addresses, Multicasting versus Broadcasting on A LAN, Multicasting on a WAN, Multicast Socket Options, mcast\_join and Related Functions, dg\_cli Function Using Multicasting, Receiving Mbone Session Announcements, Sending and Receiving, SNTP: Simple Network Time Protocol, SNTP (Continued)

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IV Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem**

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**UNIT-V**

Raw Sockets-Introduction, Raw Socket Creation, Raw Socket Output, Raw Socket Input, Ping Program, Traceroute Program, An ICMP Message Daemon,

*Datalink Access- Introduction, BPF: BSD Packet Filter, DLPI: Data Link Provider Interface, Linux: **SOCK\_PACKET**, **libpcap**: Packet Capture Library, Examining the UDP Checksum Field*  
*Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.*

**Text Books:**

1. UNIX Network Programming, by W. Richard **Stevens**, Bill Fenner, Andrew M. Rudoff, Pearson Education
2. UNIX Network Programming, 1<sup>st</sup> Edition, - W.Richard Stevens. PHI.

PG ELECTIVE – 2  
**Internetworking with TCP/IP**

**UNIT-I**

**Introduction to IP:** Data gram, Fragmentation, option, checksum, IP Design, ARP and RARP – ARP, Design, RARP.

**Internet Control Message protocol :** Types of Messages, Message format, Error reporting, query, checksum, ICMP Design.

**UNIT II**

**Internet Group Management protocol –** Multicasting, IGMP, Encapsulation, Multicast backbone, IGMP Design.

**Routing Protocols:** Interior and Exterior routings, RIP, OSPF, BGP, Multicast routing.

**BOOTP and DHCP :** BOOTP, Packet Format, operation, UDP points, using TFTP, Delay agent DHCP Operation, Packet format.

**UNIT-III**

FTP – Connections, communication, Command processing, file transfer, user interface and anonymous FTP.

**Trivial File transfer protocol :** Messages, RPQ, WRQ, Data, ACK & RROR, Connector, Data transfer UDP Ports, Examples, Security application SMTP – User agent addresses, delayed delivery, Aliases, Mail transfer agent, commands and responses, Mail transfer phases MIME, POP.

**UNIT-IV**

**Simple Network Management protocol :** Compact, S MI, Name, Type, Encoding method, MIB, SNMP – Messages, Format Encoding, Examples,

HTTP – Transaction, Request messages, Response message, header, examples.

**UNIT-V**

**World Wide Web :** Hypertext and Hypermedia, Browser architecture, Static documents, HTML, Dynamic documents, CGI, active documents, JAVA.

**IPV6 and ICMPV6 :** IPV6, IPV6 addresses, IPV6 packet format, ICMPV6, Transition from IPV4 to IPV6

**Text Books:**

1. TCP/IP Protocol Suite - Third Edition, Behrouz A. Forouzan. TMH.

JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem      L T P C

**Reference Books:**

1. Internetworking with TCP/IP Volume II, Third Edition – Douglas E. COMER/DAVID L.STEVENS, PHI.

PG ELECTIVE – 2  
**PATTERN RECOGNITION**

**UNIT I: INTRODUCTION**

Pattern and features – Training and learning in pattern recognition systems – Pattern recognition approaches – Statistical pattern recognition – Syntactic pattern recognition – Neural pattern recognition – Reasoning driven pattern recognition – Discriminant functions – Linear and Fisher's discriminant functions.

**UNIT II****STATISTICAL PATTERN RECOGNITION**

Gaussian model – Supervised learning – Parametric estimation – Maximum likelihood estimation – Bayesian parameter estimation – Perceptron algorithm – LMSE algorithm – Problems with Bayes approach – Pattern classification by distance functions – Maximum distance pattern classifier.

**UNIT III****CLUSTER ANALYSIS**

Unsupervised learning – Clustering for unsupervised learning and classification – C-means algorithm – Hierarchical clustering procedures – Graph theoretic approach to pattern clustering – Validity of clustering solutions.

**UNIT IV****SYNTACTIC PATTERN RECOGNITION**

Elements of formal grammar – String generation as pattern description – Recognition of syntactic description – Parsing – Stochastic grammar and applications – Graph based structural representation.

**UNIT V****FEATURES EXTRACTION AND RECENT ADVANCES**

Entropy minimization – Karhunen –Loeve transformation – Neural network structures for pattern recognition – Unsupervised learning – Self organizing networks – Fuzzy pattern classifiers – Genetic algorithms – Application to pattern recognition.

**TEXT BOOK**

1. Robert J, Schalkoff, "*Pattern Recognition: Statistical, Structural and Neural Approaches*", John Wiley & Sons Inc., New York, 1992.

JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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## REFERENCE BOOKS

1. Duda R.O. and Hart P.E., "Pattern Classification and Scene Analysis", John Wiley, New York, 2001
2. Morton Nadler and Eric Smith P., "Pattern Recognition Engineering", John Wiley and Sons, New York, 1993.
3. Touand , Gonzalez R. "Pattern Recognition Principles" Addison Wesley, 1974.
4. Earl Gose, Richard Johnsonbaugh, Steve Jost, "Pattern Recognition and Image Analysis", Prentice Hall of India Private Ltd., New Delhi – 110 001, 1999.
5. Duda R.O, Hart .P.E., D.G. Stal, " Pattern Classification", John Wiley, 2001
6. Sergious Theodoridis, Konstantinos Koutroumbus, "Pattern Recognition", Elsevier,2006

## PG ELECTIVE – 2 GAME THEORY

**UNIT-I:** Introduction- Game Theory, Games and Solutions Game Theory and the Theory of Competitive Equilibrium, Rational Behavior, The Steady State and Deductive Interpretations, Bounded Rationality Terminology and Notation  
Nash Equilibrium- Strategic Games, Nash Equilibrium Examples Existence of a Nash Equilibrium, Strictly Competitive Games, Bayesian Games: Strategic Games with Imperfect Information

**UNIT-II:** Mixed, Correlated, and Evolutionary Equilibrium -Mixed Strategy Nash Equilibrium Interpretations of Mixed Strategy Nash Equilibrium Correlated Equilibrium Evolutionary Equilibrium  
Rationalizability and Iterated Elimination of Dominated Actions- Rationalizability Iterated Elimination of Strictly Dominated Actions ,Iterated Elimination of Weakly Dominated Actions

**UNIT III:** Knowledge and Equilibrium -A Model of Knowledge Common Knowledge , Can People Agree to Disagree? , Knowledge and Solution Concepts, The Electronic Mail Game

**UNIT IV:** Extensive Games with Perfect Information -Extensive Games with Perfect Information Subgame Perfect Equilibrium Two Extensions of the Definition of a Game The Interpretation of a Strategy , Two Notable Finite Horizon Games , Iterated Elimination of Weakly Dominated Strategies  
Bargaining Games -Bargaining and Game Theory , A Bargaining Game of Alternating Offers Subgame Perfect Equilibrium Variations and Extensions

**UNIT V:** Repeated Games - The Basic Idea Infinitely Repeated Games vs.\ Finitely Repeated Games Infinitely Repeated Games: Definitions Strategies as Machines Trigger Strategies: Nash Folk Theorems Punishing for a Limited Length of Time: A Perfect Folk Theorem for the Limit of Means Criterion Punishing the Punisher: A Perfect Folk Theorem for the Overtaking Criterion Rewarding Players Who Punish: A Perfect Folk Theorem for the Discounting Criterion The Structure of Subgame Perfect Equilibria Under the Discounting Criterion Finitely Repeated Game

JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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TEXT BOOKS



1. M. J. Osborne and A. Rubinstein, A course in Game Theory, MIT Press
2. Roger Myerson, Game Theory, Harvard University Press
3. D. Fudenberg and J. Tirole, Game Theory, MIT Press

#### REFERENCES

1. J. von Neumann and O. Morgenstern, Theory of Games and Economic Behavior, New York: John Wiley and Sons.,
2. R.D. Luce and H. Raiffa, Games and Decisions, New York: John Wiley and Sons.,
3. G. Owen, Game Theory, (Second Edition), New York: Academic Press,

### PG ELECTIVE – 3 WIRELESS NETWORKS

#### UNIT I PHYSICAL AND WIRELESS MAC LAYER ALTERNATIVES 9

Wired transmission techniques: design of wireless modems, power efficiency, out of band radiation, applied [wireless transmission](#) techniques, short distance base band transmission, VWB pulse transmission, broad [Modems](#) for higher speeds, diversity and smart receiving techniques, random access for data oriented networks, integration of voice and data traffic.

#### UNIT II WIRELESS NETWORK PLANNING AND OPERATION 9

Wireless networks topologies, cellular topology, cell fundamentals signal to interference ratio calculation, capacity expansion techniques, cell splitting, use of directional antennas for cell sectoring, micro cell method, overload cells, channels allocation techniques and capacity expansion FCA, channel borrowing techniques, DCA, mobility management, radio resources and power management [securities](#) in wireless networks.

#### UNIT III WIRELESS WAN 9

Mechanism to support a mobile environment, communication in the infrastructure, IS-95 CDMA forward channel, IS – 95 CDMA reverse channel, pallet and frame formats in IS – 95, IMT – 2000; forward channel in W-CDMA and CDMA 2000, reverse channels in W-CDMA and CDMA-2000, GPRS and higher data rates, short messaging service in GPRS mobile application protocols.

#### UNIT IV WIRELESS LAN 9

Historical overviews of the LAN industry, evolution of the WLAN industry, wireless home networking, [IEEE 802.11](#). The PHY Layer, MAC Layer, wireless ATM, HYPER LAN, HYPER LAN – 2.

#### UNIT V WPAN AND GEOLOCATION SYSTEMS 9

IEEE 802.15 WPAN, Home RF, Bluetooth, interface between Bluetooth and 802.11, wireless geolocation technologies for wireless geolocation, geolocation standards for E.911 service.

TOTAL : 45

#### JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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#### TEXT BOOKS

1. Kaveh Pahlavan, Prashant Krishnamoorthy, Principles of Wireless Networks, - A united approach - Pearson Education,

**REFERENCES**

1. Jochen Schiller, Mobile Communications, Person Education – 2003, 2nd Edn.
2. X.Wang and H.V.Poor, Wireless [Communication Systems](#), Pearson education, 2004.
3. M.Mallick, Mobile and Wireless design essentials, Wiley Publishing Inc. 2003.
4. P.Nicopolitidis, M.S.Obaidat, G.I. papadimitria, A.S. Pomportsis, Wireless Networks, John Wiley & Sons, 2003.

PG ELECTIVE – 3  
**IMAGE PROCESSING**

**UNIT-I:****INTRODUCTION**

Origin of Digital Image processing – fundamental steps – Components of Image processing system – Visual perception – Light and EM spectrum – Image sensing and acquisition – Image sampling and Quantization – relationship between pixels

**UNIT-II:****IMAGE ENHANCEMENT**

Spatial Domain: Gray level transformation – Histogram processing – Arithmetic / Logic operations- Spatial filtering – smoothing filters – sharpening filters Frequency Domain: Fourier transform – smoothing frequency domain filters – sharpening filters – Homographic filtering

**UNIT-III:****IMAGE RESTORATION**

Model of Image degradation/ restoration process – Noise models – mean filters – order statistics – adaptive filters – band reject – bandpass – notch – optimum notch filters – Linear, position invariant degradations – establishing degradation functions – Inverse filtering – Weiner – least square – Geometric mean filters

**UNIT-IV:****IMAGE COMPRESSION**

Fundamentals – Image compression models – Information theory – error free compression: variable length – LZW – Bitplane – Lossless predictive coding; Lossy compression : Lossy predictive – transform – wavelet coding; Image compression standards

**UNIT-V:****IMAGE SEGMENTATION, REPRESENTATION & DESCRIPTION**

Segmentation: Detection of discontinuities – Edge linking & Boundary detection – Thresholding – region based segmentation.  
Representation & Description: Chain codes – Polygonal approximations – signatures – Boundary segments – Skeletons; Boundary Descriptors – Regional descriptors

**TEXT BOOK**

1. Rafael C. Gonzalez, Richard E. Woods, “*Digital Image Processing*”, 2nd edition , Pearson Education, 2007.

**REFERENCE BOOKS**

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

1. S.Annadurai, R.Shanmugalakshmi, “*fundamentals of Digital Image Processing*”, Pearson Education, 2007
2. Rafael C. Gonzalez, Richard E. Woods, Eddins, “*Digital Image Processing using MATLAB*”, Pearson Education, 2005
3. Anil Jain K. “*Fundamentals of Digital Image Processing*”, PHI, 1999.
4. William Pratt , “*Digital Image Processing*”, Wiley Interscience, 2nd edition 1991

PG ELECTIVE – 3  
**SOFT COMPUTING**

**UNIT-I:  
BASICS OF NEUROSCIENCE AND ANN MODELS**

The Brain as a Neural network-Basic Properties of Neurons – Neuron Models – Rosenblatt’s Prcpeptron – The widrow-Hoff LMS Learning Algorithm-Order of a Predicate and a Perceptron – Complexity of Learning using Feedforward Networks.

**UNIT-II:  
FUZZY SYSTEMS**

Fuzzy Sets and Fuzzy Reasoning – Fuzzy Matrices – Fuzzy Functions – Decompositions – Fuzzy Automata and Languages – Fuzzy Control Method – Fuzzy Decision Making.

**UNIT-III:  
NEURO-FUZZY SYSTEMS**

Introduction to Neuro – Fuzzy Systems –Fuzzy System Design Procedures – Fuzzy Sets and Logic Background - Fuzzy / ANN Design and Implementation

**UNIT-IV:  
GENETIC ALGORITHMS**

Introduction – Robustness of Traditional Optimization and Search Techniques – The goals of optimization-Computer Implementation-Data Structures, Reproduction, Crossover and Mutation – Mapping Objective Functions to fitness form – Some Applications of Genetic Algorithms.

**UNIT-V:  
ARTIFICIAL INTELLIGENCE**

AI technique-Level of the Model – Problems, Problem Spaces and Search – Issues in the Design of Search Programs – Heuristic Search Techniques – Knowledge Representations and Mappings

**TEXT BOOKS**

1. N. K. Bose and P. Liang , “*Neural Network Fundamentals*”
2. Timothy J. Ross , “*Fuzzy Logic with Engineering Applications*”, McGraw- Hill International Editions,1995

**REFERENCE BOOKS**

1. Elaine Rich and Kelvin knight , “*Artificial Intelligence*”,McGraw-Hill 2000

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

IV Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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2. David E. Goldberg, "*Genetic Algorithms-In Search, optimization and Machine Learning*", Pearson Education.
3. Robert J. Schalkoff, "*Artificial Neural Networks*", McGraw-Hill International Editions,1997.
4. Freeman J.A. & D.M. Skapura , "*Neural Networks: Algorithms, Applications and Programming Techniques*", Addison Wesley, 1992.
5. G.J. Klir & B. Yuan, "*Fuzzy Sets & Fuzzy Logic*", PHI, 1995.
6. Melanie Mitchell , "*An Introduction to Genetic Algorithm*", PHI, 1998.

## NETWORK PROGRAMMING LAB

### LIST OF SAMPLE PROBLEMS/EXPERIMENTS

- \*1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
- \*2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
- \*3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
- \*4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
- \*\*5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
- \*6. Write a shell script that accepts any number of arguments and prints them in the reverse order.
- \*7. Write a shell script that determines the period for which a specified user is working on the system.
- \*8. Write a shell script to list all of the directory files in a directory.
- \*9. Write an interactive file-handling shell program- Let it offer the user the choice of copying, removing or linking files. Once the user has made a choice, have the program ask him for the necessary information such as the file name, new name and so on.
- \*10. Write a shell script to find factorial of a given integer.
- \*11. Write a shell script to find the G.C.D. of two integers.
- \*12. Write a shell script to generate a multiplication table.
- \*13. Write a shell script that copies multiple files to a directory.
- \*14. Write a shell script that counts the number of lines and words present in a given file.
- \*15. Write a shell script that displays the list of all files in the given directory.
- \*16. Write a shell script (small calculator) that adds, subtracts, multiplies and divides the given two integers. There are two division options: one returns the quotient and the other returns remainder. The script requires 3 arguments: The operation to be used and two integer numbers. The options are add (-a), subtract (-s), multiply (-m), quotient (-c) and remainder (-r).
- \*\*17. Write a shell script to reverse the rows and columns of a matrix.
- \*\*18. Write a sed command that deletes the first character in each line in a file.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

IV Year IDP (B.Tech. CSE & M.Tech./MBA) II-Sem

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- \*\*19. Write a sed command that deletes the character before the last character in each line of a file.
- \*\*20. Write a sed command that swaps the first and second words in each line of a file.
- \*\*21. Write an awk script that reads a file of which each line has 5 fields – ID, NAME, MARKS1, MARKS2, MARKS3 and finds out the average for each student. Print out the average marks with appropriate messages.
- \*\*22. Write an awk script to find the factorial of a user-supplied number.
- \*\*23. The ls -l command produces a long listing of files. Write an awk script  
1) to print the selected fields (Ex: size and name of the files) from the file listing. 2) to print the size of all files and number of files.
- \*\*24. Write an awk script to count the number of lines in a file that do not contain vowels.
- \*\*25. Write an awk script to find the number of characters, words and lines in a file.
- \*\*26. Write a C program that makes a copy of a file using  
a. standard I/O                      b. system calls.
- \*27. Write a C program that counts the number of blanks in a text file  
a. Using standard I/O                      b. Using system calls
- \*\*28. Implement in C the following Unix commands using system calls  
a. cat                                      b. ls                                      c. mv
- \*\*\*29. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.  
a. File type.  
b. Number of links.  
c. Time of last access.  
d. Read, Write and Execute permissions.
- \*\*30. Write a C program to emulate the Unix ls -l command.
- \*31. Write a C program that creates a directory, puts a file into it, and then removes it.
- \*32. Write a C program that searches for a file in a directory and reports whether the file is present in the directory or not.
- \*33. Write a C program to list for every file in a directory, its inode number and file name.
- \*\*34. Write a C program that creates a file containing a hole which is occupying some space but having nothing.
- \*35. Write a C program that demonstrates redirection of standard output to a file. Ex: ls > f1.
- \*36. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
- \*37. Write a C program to create a Zombie process.
- \*38. Write a C program that illustrates how an orphan is created.
- \*\*39. Write a C program that creates a child process to execute a command. The command to be executed is passed on the command line.
- \*\*40. Write a C program that accepts two small numbers as arguments and then sums the two numbers in a child process. The sum should be returned by child to the parent as its exit status and the parent should print the sum.
- \*\*41. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: - ls -l | sort
- \*\*\*42. Write C programs that illustrate communication between two unrelated processes using named pipe.
- \*\*43. Write a C program in which a parent writes a message to a pipe and the child reads the message.
- \*44. Write a C program that illustrates suspending and resuming processes using signals.
- \*45. Write a C program that displays the real time of a day every 60 seconds, 10 times.
- \*\*46. Write a C program that runs a command that is input by the user and prints the exit status if the command completes in 5 seconds. If it doesn't, then the parent uses kill to send a SIGTERM signal to kill the child process.
- \*\*\*47. Write a C program that illustrates file-locking using semaphores.
- \*\*\*48. Write a C program that implements a producer-consumer system with two processes. (Using semaphores).
- \*\*49. Write client and server programs (using C) for  
a. Interaction between server and client processes using Unix Domain Sockets.  
b. Interaction between server and client processes using Internet Domain Sockets.
- \*\*50. Write a C program ( sender.c )  
a. to create a message queue with read and write permissions.  
b. to write 3 messages to it with different priority numbers.
- \*51. Write a C program (receiver.c) that receives the messages (from the above message queue as specified in 63.a) and displays them.
- \*\*52. Write a C program that illustrates two processes communicating via shared memory.
- \*\*\*53. Design a TCP iterative Client and server application to reverse the given input sentence
- \*\*\*54. Design a TCP iterative Client and server application to reverse the given input sentence
- \*\*\*55. Design a TCP client and server application to transfer a file
- \*\*\*56. Design a TCP concurrent server to convert a given text into upper case using multiplexing system call "select"

- \*\*\*57. Design a TCP concurrent server to echo given set of sentences using poll functions
- \*\*\*58. Design UDP Client and server application to reverse the given input sentence
- \*\*\*59. Design UDP Client server to transfer a file
- \*\*\*60. Design using poll client server application to multiplex TCP and UDP requests for converting a given text into upper case.
- \*\*\*61. Design a RPC application to add and subtract a given pair of integers

**TEXT BOOKS:**

1. Advance Unix Programming Richard Stevens, Second Edition Pearson Education
2. Advance Unix Programming, N.B. Venkateswarlu, BS Publication.
3. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Thomson.
4. Unix and Shell Programming, M.G. Venkatesh Murthy, Pearson Education.
5. Unix Shells by Example, 4th Edition, Ellie Quigley, Pearson Education.

- \* Simple
- \*\* Moderate
- \*\*\* Complex

**INTERNET PROTOCOLS**

**Unit – I Introduction**

Internet administration and standards. The OSI model and TCP/IP protocol, TCP/IP Versions.

**Unit – II Internet Protocol**

IP addressing, different classes, subnetting, supernetting, delivery and routing of IP packets, IP design, ARP and RARP. Internet control message protocol, message format, error reporting and query, ICMP design, Internet group message protocol and its design, user datagram protocol, operation and design.

**Unit – III Transmission Control Protocol.**

TCP services, flow control, error control, connection, congestion control, TCP design and operation, routing protocol, RIP, OSPF and BGP.

**Unit – IV**

BOOTP and DHCP, DNS name space, distribution of name space, DNS resolution, types of records, Telnet and remote login. File Transfer Protocol, connection, communication and command processing, TFTP, simple mail transfer protocol, addresses, mail delivery, multipurpose Internet mail extensions. Post office protocol.

**Unit – V**

Simple Network Management Protocol, Hypertext Transfer Protocol, Next Generation IP Protocols, IPv6 and ICMPv6.

**Text Books:**

1. TCP/IP Protocol Suite – By Behrouz A. Porouzan, TMH, ed.-2000.
2. Internet Working with TCP/IP Vol.I: Principles, Protocols and Architecture – by Douglas E. Comes. (PHI)-1997.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

V Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem      L T P C  
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V Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem      L T P C  
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PG ELECTIVE – 4  
**SIMULATION AND MODELING**

**UNIT-I INTRODUCTION**

Systems, modeling, general systems theory, Concept of simulation, Simulation as a decision making tool, types of simulation.

**UNIT-II RANDOM NUMBERS**

Pseudo random numbers, methods of generating random variables, discrete and continuous distributions, testing of random numbers.

**UNIT – III DESIGN OF SIMULATION EXPERIMENTS**

Problem formulation, data collection and reduction, time flow mechanism, key variables, logic flow chart, starting condition, run size, experimental design consideration, output analysis and interpretation validation.

**UNIT-IV SIMULATION LANGUAGES**

Comparison and selection of simulation languages, study of anyone simulation language.

**UNIT-V CASE STUDIES**

Development of simulation models using simulation language studied for systems like queuing systems, Production systems, Inventory systems, maintenance and replacement systems and Investment analysis.

**TEXT BOOKS**

1. Geoffrey Gordon, "System Simulation", 2<sup>nd</sup> Edition, Prentice Hall, India, 2002.
2. Narsingh Deo, "System Simulation with Digital Computer, "Prentice Hall, India, 2001.

**REFERENCES**

1. Jerry Banks and John S.Carson, Barry L. Nelson, David M.Nicol, "Discrete Event System Simulation", 3<sup>rd</sup> Edition, Prentice Hall, India, 2002.
2. Shannon, R.E. Systems simulation, The art and science, Prentice Hall, 1975.
3. Thomas J. Schriber, Simulation using GPSS, John Wiley, 1991.

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V Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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**SCRIPTING LANGUAGES**

**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 Issues.

**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 language, 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 , 3<sup>rd</sup> 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.

**CLOUD COMPUTING**

**UNIT-I**

Introductory concepts and overview: Distributed systems – Parallel computing architectures: Vector processing, Symmetric multi processing and Massively parallel processing systems – High performance Cluster computing – Grid computing – Service Oriented Architecture overview – Virtualization.

**UNIT-II**

Overview of Cloud Computing: Meaning of the terms cloud and cloud computing – cloud based service offerings – Grid computing Vs Cloud computing – Benefits of cloud model – limitations – legal issues – Key characteristics of cloud computing – Challenges for the cloud – The evolution of cloud computing.

Web services delivered from the cloud: Infrastructure as a service – Platform-as-a-service – Software-as-a-service. Building Cloud networks: Evolution from the MSP model to cloud computing and software-as-a-service – The cloud data center – SOA as step toward cloud computing – Basic approach to a data center based SOA.

**UNIT – III**

Federation Presence, Identity and Privacy in the cloud: Federation in the cloud – Presence in the cloud – Privacy and its relation to cloud based information system. Security in the Cloud: Cloud security challenges – Software-as-a-service security

Common Standards in Cloud computing: The open cloud consortium – The distributed management task force – standards for application developers – standards for messaging – standards for security

**UNIT – IV**

End user access to cloud computing: youtube – zimbra – Facebook – Zoho – DimDim Collaboration

Mobile internet devices and the cloud: Smartphone – mobile operating systems for smart phones – Mobile Platform virtualization – Collaboration applications for mobile platforms – Future trends

**UNIT – V**

Virtualization: Adding guest Operating system. Cloud computing case studies1: Amazon EC2 – Amazon simple DB – Amazon S3 – Amazon Cloud Front – Amazon SQS

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V Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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Cloud computing case studies2: Google App Engine- Google web tool kit – Microsoft Azure Services platform – Windows live – Exchange on line – Sharepoint services – Microsoft dynamic CRM – salesforce.com CRM – App Exchange

**Text Books:**

1. Cloud Computing implementation, management and security by John W. Rittinghouse, James F. Ransome, CRC Press, Taylor & Francis group, 2010
2. Cloud Computing a practical approach by Anthony T. velte, Toby J. velte Robert Elsenpeter, Tata Mc Graw Hill edition, 2010

**References:**

1. Cloud Application Architectures by George Reese, Oreilly publishers
2. Cloud computing and SOA convergence in your enterprise, by David S. Linthicum, Addison- Wesley

**ETHICAL HACKING**

**UNIT I**

Hacking windows – Network hacking – Web hacking – Password hacking. A study on various attacks – Input validation attacks – SQL injection attacks – Buffer overflow attacks - Privacy attacks.

**UNIT II**

TCP / IP – Checksums – IP Spoofing port scanning, DNS Spoofing. Dos attacks – SYN attacks, Smurf attacks, UDP flooding, DDOS – Models. Firewalls – Packet filter firewalls, Packet Inspection firewalls – Application Proxy Firewalls. Batch File Programming.

**UNIT III**

Fundamentals of Computer Fraud – Threat concepts – Framework for predicting inside attacks – Managing the threat – Strategic Planning Process.

**UNIT IV**

Architecture strategies for computer fraud prevention – Protection of Web sites – Intrusion detection system – NIDS, HIDS – Penetrating testing process – Web Services – Reducing transaction risks.

**UNIT V**

Key Fraud Indicator selection process customized taxonomies – Key fraud signature selection process – Accounting Forensics – Computer Forensics – Journaling and it requirements – Standardized logging criteria – Journal risk and control matrix – Neural networks – Misuse detection and Novelty detection.

**REFERENCES**

1. Kenneth C.Brancik “Insider Computer Fraud” Auerbach Publications Taylor & Francis Group–2008.
2. Ankit Fadia “ Ethical Hacking” second edition Macmillan India Ltd, 2006

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V Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem L T P C  
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V Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem L T P C  
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**PERVASIVE COMPUTING**

**Unit I:**

Pervasive Computing Application - Pervasive Computing devices and Interfaces- Device technology trends, Connecting issues and protocols

**Unit II:**

Pervasive Computing and web based Applications - XML and its role in Pervasive Computing - Wireless Application Protocol (WAP) Architecture and Security – Wireless Mark-Up language (WML) – Introduction

**Unit III:**

Voice Enabling Pervasive Computing - Voice Standards - Speech Applications in Pervasive Computing and security

**Unit IV:**

PDA in Pervasive Computing – Introduction - PDA software Components, Standards, emerging trends - PDA Device characteristics - PDA Based Access Architecture

**Unit V:**

User Interface Issues in Pervasive Computing, Architecture - Smart Card-based Authentication Mechanisms - Wearable computing Architecture

**Text Books:**

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaefer & Klaus Rindtorff. --- Pervasive Computing Technology and Architecture of Mobile Internet Applications, Addison Wesley, Reading, 2002.
2. Uwe Hansman, Lothar Merk, Martin S Nicklous & Thomas Stober: Principles of Mobile Computing, Second Edition, Springer- Verlag, New Delhi, 2003.

**Reference Books:**

1. Rahul Banerjee: Internetworking Technologies: An Engineering Perspective, Prentice –Hall of India, New Delhi, 2003. (ISBN 81-203-2185-5)
2. Rahul Banerjee: Lecture Notes in Pervasive Computing, Outline Notes, BITS-Pilani, 2003.

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V Year IDP (B.Tech. CSE & M.Tech./MBA) I-Sem

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**HIGH PERFORMANCE COMPUTING**

**Objective:** To introduce students to the new computing technologies such as Grid Computing, clusters computing, Quantum computing & pervasive computing etc.

**UNIT I**

Grid Computing: Data & Computational Grids, Grid Architectures and its relations to various Distributed Technologies. Autonomic Computing, Examples of the Grid Computing Efforts (IBM).

**UNIT II**

Cluster Setup & its Advantages, Performance Models & Simulations; Networking Protocols & I/O, Messaging Systems. Process Scheduling, Load Sharing and Balancing; Distributed Shared Memory, Parallel I/O.

**UNIT III**

Example cluster System – Beowulf; Cluster Operating systems: COMPas and NanOS

Pervasive Computing Concepts & Scenarios; Hardware & Software; Human – Machine Interface.

**UNIT IV**

Device Connectivity; Java for Pervasive Devices; Application Examples.

**UNIT V**

Classical Vs Quantum Logic Gates; One, Two & Three Qubit Quantum Gates; Fredkin & Toffoli Gates; Quantum Circuits; Quantum Algorithms.

**Text book:**

1. “Selected Topics in Advanced computing” Edited by Dr. P. Padmanabham and Dr. M.B. Srinivas, 2005 Pearson Education.

**Reference Books:**

1. J. Joseph & C. Fellenstien: ‘Grid Computing’, Pearson Education
2. J. Burkhardt et.al: ‘pervasive computing’ Pearson Education
3. Marivesar: ‘Approaching quantum computing’, Pearson Education.

4. Raj kumar Buyya: 'High performance cluster computing', Pearson Education.
5. Neilsen & Chung L: 'Quantum computing and Quantum Information', Cambridge University Press.
6. A networking approach to Grid Computing, Minoli, Wiley

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**IDP (B.Tech. CSE. & M.Tech. /MBA) IV Year I-Sem**

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**PGC-1 RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS**

**The objective of the course is to introduce the basic methods of conducting research, explore ideas in formulating research objectives and hypotheses and sample framework for undertaking research studies through well designed and structured questionnaires. Also it is intended to facilitate for the development of an insight into different statistical tools for data analysis, interpretation and presentation of reports in different functional areas of management.**

\*Statistical table is required for students at the time of examination

**Unit – 1:Introduction:** Nature and Importance of research, the role of business research, aims and types of social research, research process - primary data and secondary data, Questionnaire and schedules as tools of collecting data. Sampling design and sampling procedures. Diagrammatic and graphical presentation of data. Tabulation of data and general rules of tabulation. SPSS for tabulation and SPSS and Report Presentation- Mechanics of report writing, preliminary pages, main body and appendices including bibliography.

**Unit – 2:Measurement concepts:** Measurement and Scaling concepts, attitude measurement, questionnaire design, Psychometric, psychological and social instruments used in management research. Levels of measurement and types of scales. Criteria for good measurement. Research Design: Meaning of Research Design. Functions and goals of Research Design, pilot study and developing a case study.

**Unit – 3:Statistical Tools-I:** Measures of Central Tendency, Measures of Dispersion, Measures of Variation, Measures of Central Tendency vs. Measures of Dispersion, Normal distribution, Measures of Skewness and Interpretation- Correlation and Regression Analysis, method of least squares, regression vs. correlation, correlation vs. determination. Types of correlation and their specific applications.

**Unit – 4:Statistical Tools-II: Time series, utility of time series, components,** measurement of trend through Method of Least Squares, Moving averages, and Graphical methods. Index Numbers: Laspeyres's

Index, Paasche's Index, Fischer's Ideal index, Time Reversal and Factor Reversal tests.

**Unit – 5:Statistical Inference:** Introduction to Null hypothesis vs. alternative hypothesis, Tests of Hypothesis, parametric vs. non-parametric tests, procedure for testing of hypothesis, tests of significance for small samples, application, t-test, ANOVA – one way and two way classifications and Chi-square test, Association of attributes and inferences.

## References

- Donald R. Cooper, Pamela S. Schindler: Business Research Methods, 8/e, TMH, 2009.
- Gaur: Statistical Methods for Practice and Research, Sage Publication,2009
- Bhandarkar & Wilkinson: Methodology and Techniques of Social Research, Himalaya, 2009
- Bajpai: Business Statistics, Pearson, 2009.
- Dipak Kumar.Bhattacharya: Research Methodology, Excel Books, 2009
- William G. Zikmund: Business Research Methods, Cengage, 2006.
- Alan Bryman & Emma Bell: Business Research Methods, 2/e, Oxford, 2008.
- Shajahan: Research Methods for Management,3/e. Jaico, 2009
- Richard I Levin & David S.Rubin: Statistics for Management, 7/e. Pearson, 2008.
- C.R Kothari: *Research Methodology Methods & Techniques*, 2/e, Vishwa Prakashan, 2009.
- C.B. Gupta & Vijay Gupta: An introduction to Statistical Methods, Vikas, 2009.
- J.K.Sachdeva: Business Research Methodology, Himalaya,2009
- Nargundkar: Marketing Research Tests and Cases, TMH, 3/e,2009
- Narayana Reddy,Acharyulu: Research Methodology and Statistical Tools, Excel, 2009

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### PGC-2 MARKETING MANAGEMENT

The objective of the course is to provide the students a clear view on the Marketing management, which has Marketing mix and Basics of Marketing as its main part of the curriculum.

**Unit – 1:Introduction to Marketing:** Understanding Marketing Management- Developing Marketing Strategies and Plans – Marketing Concept Vs Product Concept – Service Concept – Experience Concept – Green Marketing – Efficiency Vs Effectiveness- Limitations of Marketing concept- Marketing orientation and Business performance – Gathering Information and Scanning environment.

**Unit – 2: Marketing Research:** Need for Marketing Research-Types of Marketing Research – Stages of Marketing Research – Marketing Environment- Customer value proposition – Non segmented markets-Purpose of Segmentation – Segmentation and Market Entry – Target market selection – Strategies of Target Marketing – Analysing Business markets – Analysing Consumer Markets.

**Unit – 3: Marketing Mix- I :** Creating Customer Value-Satisfaction and loyalty- Product Management-Business Product and Consumer Product-Technology Products-Commodity Products-Customised Products-Product line and product mix – Managing product line and brands – Product Life Cycle (PLC) – Excessive Product Variants-Product line portfolios – Product Recalls – Setting Product Strategy. Pricing Strategy – Methods of Pricing – Factors influencing Pricing decision- Pricing cues – Consumption and pricing – Price Sensitivity – Initiating Price Changes – Price Wars- Product mix pricing-Ingredient branding.

**Unit – 4: Marketing Mix – II:** Designing and Managing Services-Marketing strategies for service firms – Distinctive Characteristics of Services – Customer Relationship – Distribution Designing – Marketing Channel and value networks – Role of marketing channels – Channel design decisions- Channel management decisions- Channel Integration and systems – E- Commerce – Conflict – Cooperation and competition – Retailing – Wholesaling – Logistics. Communicating Value – Role of Marketing Communication – Developing Effective Communication –

Marketing Communication Mix – Managing the Integrated Marketing Communications process – Managing Mass Communication.

**Unit – 5: Managing Personal Communication** – Word of mouth – Designing Sales force- Direct Marketing Techniques – Internet Marketing - New product options and development – Development to commercialization – Consumer adoption process – Tapping Global markets – Developed vs Developing markets – Managing a Holistic Marketing Organization – Socially Responsible Marketing – Internal Marketing - Rural Marketing – Rural Consumer Behaviour – Pricing Decision and Distribution Decisions - Future of Marketing

### References

- Philip Kotler, Kevin Lane Keller, Abraham Koshy and Mithleshwar Jha: Marketing Management, 13/e, Pearson Education, 2009
- Rajan Saxena: Marketing Management, 3/e, TMH, 2008
- Peter Chevtov: Key Marketing Skills, Kogan Page, 2009
- K.Karunakaran: Marketing Management (Text and Cases), 2/e, Himalaya, 2009
- Tapan K Panda: Marketing Management, Excel, 2009
- V.S.Ramaswamy & S.Nama Kumari: Marketing Management, 4/e, Macmillan 2009.
- Arun kumar & N. Meenakshi: Marketing Management, Vikas, 2009
- Dholakia,Anwar et.al: Marketing Management-PHI-2009.
- David Jobber & John Fahy: Foundations of Marketing, TMH, 2009
- Joel R. Evans & Barry Berman: Marketing Management, Cengage, 2008.
- William D Perreault Jr, E Jerome Mc Carthy: Basic Marketing, 15/e, Tata McGraw Hill, 2007
- Patrik Forsyth: Marketing Stripped Bare, Kogan Page,2009
- Michael J Etzel, Bruce J Walker, William J Stanton & Ajay Pandit: Marketing, 13/e, TMH, 2008.

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- The rule of three, 2005 (Marketing)
- The future of Competition, 2005. (Marketing)

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**PGC-3 BUSINESS ENVIRONMENT**

The objective of the course is to provide the student with a background of various factors( in macro-economic environment) that have major repercussions on business and sharpen the students' mind to watch and update the changes that occur constantly in this sphere.

**Unit – 1:Industrial Policies:** A brief review of industrial policies since independence, Industrial policy of 1991 and recent developments, Policy on foreign direct investment in Indian industry- Policy on Public Private Partnerships.

**Unit – 2:Fiscal & Monetary Policies:** Public revenues, public expenditure, public debt, development activities financed by public expenditure, An evaluation of recent fiscal policy of Government of India – Highlights of Budget - Monetary Policy: Demand for and supply of money, Objectives of monetary and credit policy, Recent trends- Role of Finance Commission.

**Unit – 3:India's Trade Policy & Balance of Payments:** India's Trade Policy – Magnitude and direction of Indian International trade, bilateral and multilateral trade agreements, EXIM Policy, Role of EXIM Bank. Balance of Payments: Structure, Major components, Causes for disequilibrium in Balance of Payments, correction measures, Impact of New Economic Policy on Balance of Payments, Recent trends.

**Unit – 4:World Trade Organisation (WTO):** Nature and scope - Organisation and structure – trading blocks – role and functions of WTO in promoting world trade – Principles followed- Agreements reached in the Uruguay round including TRIPS, TRIMS and GATS, Disputes settlement mechanism- Dumping and Anti-dumping measures – Critical review of WTO functioning.

**Unit – 5: Money Markets and Capital Markets:** Features and components of Indian Financial system, objectives, features and structure of Money markets and capital markets, Reforms and Recent Developments - Stock Exchanges, Investor Protection and Role of SEBI.

**References**

Misra and Puri: Indian Economy, Himalaya, 2009.

- Justin Paul: Business Environment—Text and Cases, TMH, 2009
- Vivek Mittal: Business Environment, Excel, 2009
- Conklin: Cases in Environment of Business, Sage, 2008
- BPP: Business Environment, Viva, 2009
- Shaikh Saleem: Business Environment, 4/e, Pearson, 2008
- K. Aswathappa: *Essentials of Business Environment*, 9/e Himalaya, 2009.
- Dutt and Sundaram: *Indian Economy*, S. Chand, New Delhi, 2009.

Francis Cherunilam: Business Environment: Text and Cases, 18/e, Himalaya, 2009.

- Recent: *Economic Survey Report* of Government of India.
- Suresh Bedi: Business Environment, Excel, 2009.
- V K Pailwar: Economic Environment of Business, PHI, 2008.
- DE Bouchoux: Intellectual Property Rights, Cengage, 2005.
- Gopal: Business Environment, 2/e, TMH, 2009

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### IDP (B.Tech. CSE. & M.Tech. /MBA) IV Year I-Sem

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### PGC-4 BUSINESS LAW AND REGUALTION

The objective of the course is to enable students understand and appreciate the legal and regulatory framework of Indian operations of business.

**Unit – 1:Law of Contract -1872** :Nature of contract and essential elements of valid contract, Offer and Acceptance, Consideration, Capacity to contract and free consent, Legality of object. Unlawful and illegal agreements, Contingent contracts, Performance and discharge of contracts, Remedies for breach of contract.

**Unit – 2:Contracts-II:** Indemnity and guarantee, Contract of Agency, Sale of goods Act -1930: General Principles, Conditions & Warranties, Performance of Contract of Sale.

**Unit – 3:Negotiable Instruments Act - 1881:** Negotiable Instruments-Promissory Note, Bills of Exchange, & Cheque, and their definitions and characteristics, Types of endorsements, Holder- Holder in due course, Discharge of Parties.

**Unit – 4:Companies Act, 1956:** Steps and procedure for incorporation of the company, Company Management–Appointment of Directors, Powers, duties, & liabilities of Directors, Company Meetings, Resolutions, Winding-up of a Company.

**Unit – 5:Direct and Indirect Tax:** Income Tax Act -1961 - Important Provisions of Income Tax Act: Assessment year –Assesee, Gross Total Income, Procedure for advance payment of tax and tax deducted at source. Assessment procedure. Central Excise Act -1944: .Basic concepts related to excisable goods, classification of goods, and Basic concept of VAT.

### References

- Akhileshwar Pathak: Legal Aspects of Business, TMH, 3/e, 2009
- K.R. Bulchandani: Business Law for Management, 5/e, Himalaya, 2008

- Kuchal: Business Law, Vikas, 2009
- Tulsian:Business Law, TMH, 2008.
- N.D.Kapoor: Mercantile Law, Sultan Chand & Sons, 2009.
- S.N.Maheshwari & Maheshwari: *Business Law and Regulation*, Himalaya,.2008
- S.S.Gulshan: Business Law, 2/e, Excel Books, 2006
- B.B. Lal: Income Tax and Central Tax : Law and Practice, Pearson Education, Latest edition.
- B.B. Lal & N.Vashisht: Direct Taxes, 28/e, Pearson Education, Latest edition.
- C.L.Bansal: Business and Corporate Laws, Excel Books, 2009



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**PGC-5 HUMAN RESOURCE MANAGEMENT**

The objective of the course is to provide basic knowledge of functional are of Human Resource Management. This will be the prerequisite for enabling students to take any electives offered in third and fourth semesters any subject on HRM stream.

**Unit – 1:** Introduction to HRM, Objectives of HRM, HR activities, Challenges of HRM - Job Analysis and Design: Uses of Job analysis, methods of data collection, Job Description and Specifications. Job design, Job redesign, Job Rotation, Job enlargement, Job enrichment, HR Planning: Strategic and Human Resource Planning, HR Planning process, HR Information systems, Assessment of HR requirements, HR Functions and Policies. Cases.

**Unit – 2:** Recruitment and Selection: The Recruitment Process, Methods of recruiting, realistic job preview, developing and using Application Blanks, Challenges of recruiting. The selection process, type of tests, basic features of interviews, types of interviews, Technical, HR interview, interview errors and bias, designing and conducting the effective interview, Co-operative counseling, reference and background verification, medical evaluation, Job offer, Induction and Placement. Cases.

**Unit – 3:** Training and Development & Performance Appraisal: Introduction to training, The training process, training methods, Management development – individual, group, organizational techniques, evaluation of training and development -Appraising and Managing Performance: The appraisal process, methods, and potential problems in performance evaluations. The appraisal interview, the feedback interview. The role of appraisal in managing performance. Career Planning and Development. Cases.

**Unit – 4:** Compensation: Objectives, Influences on compensation, Compensation and motivation, job evaluation system – simple ranking, job grading, point systems, and factor–comparison system, Human

relations effects of Job evaluation, compensation for special groups. Cases.

**Unit – 5:**Integration: Quality of work life, Quality circles, Industrial Relations, Industrial Disputes and causes, remedial measures, Collective Bargaining. The management of conflict: Sources of grievances, the grievance procedure, Guidelines for handling grievances- Maintenance of HR:

- a) Benefits and services, security, safety, health and welfare services.
- b) Separation, Corporate social responsibility, Global HRM. Cases

**References**

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- Saiyadain: Human Resource Management, 4/e, TMH,2009

**CDs (EXCEL MULTIMEDIA)**

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Communications Ltd.

**SERVICE  
DELIVERY**

**HR EXECUTION IN A  
M&A BUSINESS  
ENVIROMENT**

**TALENT  
MANAGEMENT**

**INNVATE OR  
EVAPORATE: HR  
INNOVATIONS**

**HR RELATED  
ASPECTS OF CRM**

**REWARD/RECOGNITI  
ON SYSTEMS**

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IDP (B.Tech. CSE. & M.Tech. /MBA) IV Year II-Sem**

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**PGC-6 FINANCIAL MANAGEMENT**

The objective of the course is to provide the necessary basic inputs and tools to manage the finance function. After the completion of the course, the students should be able to understand the management of finances of the business organization

**\*The students need Discounting Table and Annuity tables for the examination**

**Unit – 1:** Introduction to The Finance Function and Capital Budgeting – Objective: Profit or Wealth Maximization and EPS Maximization. An overview of Managerial Finance functions - Time value of money: present value, future value of money and the basic valuation models- Nature and techniques of capital budgeting: Payback method, Average rate of return and Time-Adjusted methods: IRR and NPV, Profitability index, and Excess present value index. Cases in capital budgeting.

**Unit – 2:** Capital Structure Decisions: Concept and measurement of cost of capital, Debt vs. Equity, cost of equity, preference shares, equity capital and retained earnings, weighted average cost of capital and marginal cost of capital. Importance of cost of capital in capital budgeting decisions- Capital structure vs financial structure - Capitalisation, financial leverage, operating leverage and composite leverage. EBIT-EPS Analysis, Indifference Point/Break even analysis of financial leverage,

**Unit – 3:**Capital Structure and Dividend Theories: The Modigliani Miller Theory, NI, NOI Theory and Traditional Theory –A critical appraisal- Dividends and value of the firm - Relevance of dividends, the MM hypothesis, Factors determining Dividend Policy-dividends and valuation of the firm-the basic models. Declaration and payment of dividends. Bonus shares. Rights issue, share-splits, Walter Model and Gordon Model.

**Unit – 4:**Working Capital Management: Components of working capital, gross vs. net working capital, determinants of working capital needs, the operating cycle approach. Planning of working capital, Financing of

working capital through Bank finance and Trade Credit – Recommendations of Tandon and Daheja Committee on Working Capital. Cases.

**Unit – 5:**Management of current assets: Management of cash,– Basic strategies for cash management, cash budget, cash management techniques/processes. Marketable securities: characteristics, selection criterion, Marketable security alternatives; Management of receivables and Management of inventory- The importance of current assets management in working capital planning.

### References

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- Collin Barrow: Practical Financial Management, Kogan Page,2009
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- Besley and Brigham: Essentials of Managerial Finance, 13/e Cengage, 2006

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### IDP (B.Tech. CSE. & M.Tech. /MBA) IV Year II-Sem

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### PGC-7 QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS

**The objective of the course is to provide the basic tools of Operations Research in solving the management problems through modeling and using mathematical approach.**

\*The students have to be provided with Random Number Table to solve problem in the examination

**Unit – 1:Introduction and Linear Programming:** Nature and Scope of O.R.–Analyzing and Defining the Problem, Developing A Model, Types of models, Typical Applications of Operations Research ; Linear Programming: Graphical Method, Simplex Method; Solution methodology of Simplex algorithm, Artificial variables; Duality Principle , Definition of the Dual Problem, Primal - Dual Relationships.

**Unit – 2:Transportation and Assignment Models:** Definition and Application of the Transportation Model, Solution of the Transportation Problem, the Assignment Model, Traveling Salesman Problem.

**Unit – 3:Replacement Model:** Replacement of Capital Cost items when money's worth is **not** considered, Replacement of Capital Cost items when money's worth is considered, Group replacement of low cost items.

**Unit – 4:Game Theory and Decision Analysis:** Introduction – Two Person Zero-Sum Games, Pure Strategies, Games with Saddle Point, Mixed strategies, Rules of Dominance, Solution Methods of Games without Saddle point – Algebraic, arithmetic methods. Decision Analysis: Introduction to Decision Theory, Steps In the Decision Making, the Different environments In Which Decisions Are Made, Criteria For Decision Making Under Risk and Uncertainty, The Expected Value Criterion With Continuously Distributed Random

Variables, Decision Trees, Graphic Displays of the Decision Making Process.

**Unit – 5:Queuing Theory and Simulation:** Basic Elements of the Queuing Model, Poisson Arrivals and Exponential Service times; Different Queing models with FCFS Queue discipline: Single service station and infinite population, Single service station and finite population, Multi service station models with infinite population. **Simulation:** Nature and Scope, Applications, Types of simulation, Role of Random Numbers, Inventory Example, Queuing Examples, Simulation Languages.

#### References

- Hillier/Lieberman: *Introduction To Operations Research*; TMH, 2008.
- Render: *Quantitative Analysis for Management*, Pearson, 2009
- Sridharabhat: *Quantitative Analysis for Business Decisions*, HPH, 2009.
- J. K. Sharma: *Operations Research: Theory and Applications*, Macmillan, 2008.
- R.Panneerselvam: *Operations Research*, PHI, 2008.
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- Gupta and Khanna: *Quantitative Techniques for Decision Making*, PHI, 2009.
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### PGC-8 PRODUCTION AND OPERATIONS MANAGEMENT

The Objective of the course is to enable students to understand the basics of one of the functional areas of management viz. Operations or Production.

**\*The students need Statistical Table to solve problem**

**Unit – 1:Introduction: Overview of Production and Operations Management (POM)** Function, Historical Development of POM, POM scenario Today - Product and Process Design: Product and Process Development, Manufacturing Process Technology, Value Analysis.

**Unit – 2:Facilities Management & Aggregate Planning:** Location of Facilities, Layout of Facilities, Optimisation of Product/Process Layout, Aggregate Planning : Preparation of aggregate demand Forecast, Specification of Organisational Policies For Smoothing Capacity Utilization, Determination of feasible Production Alternatives and Determination of Optimal Production Strategy.

**Unit – 3:Scheduling:** Scheduling In Job, Shop Type Production, Shop-Loading, Assignment and Sequencing, Scheduling In Mass, Line of Balance, Methods of Production Control ,World class production .

**Unit – 4:Work Study & Quality Management:** Method Study, Work measurement, Work Design, Job Design, Work Sampling, Industrial Engineering Techniques. Quality management: Economics of Quality Assurance Inspection and Quality Control, Control charts for

variables and control charts for attributes, Acceptance Sampling, Total Quality Management and ISO 9000 series standards, Six Sigma.

**Unit – 5:P.E.R.T. & C.P.M.** : Drawing networks – identifying critical path – probability of completing the project within given time- project crashing – optimum cost and optimum duration.

### References

- Chase, Aquilano, Jacobs: Operations Management for Competitive Advantage, TMH, 2009
- Mahadevan:Operations Management, Pearson, 2009
- Aswathappa:Production & Operation Management, HPH, 2008
- Young: Essentials of Operations Management, Sage, 2009
- Kachru: Production and Operations Management, Excel, 2009
- Donald Waters: Operations Management, Kogan Page, 2009
- Buffa: Modern Production Operation Management, Wiley 2009.
- Lee Krajewski, Larry Ritzman and Manoj Malhotra: Operations Management, 8/e PHI, 2009
- S N Chary: Theory and Problems in Production and Operations Management, TMH, 2009.
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### IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem

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### PGC-9 SUPPLY CHAIN MANAGEMENT

The Objective of this course is to gain the knowledge of possibilities of efficient optimization and management of operation in integrated supply chains and also the ability to apply them in the enterprise reality. The course will also strengthen the holistic view on supply chain operations, management and strategy and some current research areas in supply chain management. Consequently the course provides advanced knowledge about logistics and their supporting systems from a supply chain perspective.

**\*The students need Statistical Table to solve numerical problems.**

Prerequisite for the course:- Knowledge of Production and Operations Management, Marketing Management and QABD taught in second semester of the programme.

**Unit – 1:Understanding the Supply Chain:** Objective and Importance of Supply Chain Process View of Supply Chain. Competitive and Supply Chain Strategies, Achieving Strategic Fit, Expanding Strategic Scope. Logistics: The Logistical value proposition, The Work of Logistics, Logistical operations, Logistical operating arrangements, Supply chain Synchronization , Supply Chain Drivers and Metrics :Drivers for Supply Chain Performance, Framework for Structuring drivers. Facilities, inventory, transportation, information, sourcing and pricing. Obstacles to Achieving fit, Supply chain performance in India. Case studies

**Unit – 2: Designing the Supply Chain Network :** Role of distribution in the Supply Chain, Factors influencing Distribution network design, Design options for Distribution network, The role of network design in the Supply Chain, Frame work for Network design decisions, Models for facility location and capacity allocation, Planning Demand and Supply in a Supply Chain: Demand Forecasting in Supply Chain: Components of forecast and forecasting methods, Aggregate Planning in Supply Chain: Role of aggregate planning, Aggregate planning Strategies , Inventory planning and economic theory aberrations. Case studies

**Unit - 3 Planning and Managing inventories in Supply Chain:** Managing Economies of Scale in Supply Chain, Managing Uncertainty in a Supply Chain, Determining optimal level of product inventory. Designing and Planning Transportation Networks: Transportation in a Supply Chain. Case studies

**Unit – 4: Managing Cross Functional Drivers in a Supply Chain:** Sourcing decisions in a Supply Chain and procurement strategies, Pricing and Revenue Management in a Supply Chain, Information Technology and Coordination in a Supply chain. Case studies

**Unit- 5: Logistics and Supply chain relationships:** Identifying logistics performance indicators –Channel structure – Economics of distribution – channel relationships –logistics service alliances. Managing Global logistics and Global supply chains: Logistics in a global economy – views of global logistics- global operating levels – interlinked global economy - The Global supply chains , Supply Chain Management in Global environment–Global strategy – Global purchasing – Global logistics– Global alliances –Issues and Challenges in Global supply chain Management – Case studies.ss

References

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2. Donald J.Bowersox and David J.Closs: Logistical Management: The Integrated Supply Chain Process, TMH, 2006.
3. Rajasekhar & Acharyulu: Logistics and Supply Chain Management, Excel, 2009.
4. Sridhara Bhat: Logistics and supply chain management, Himalaya, 2009.
5. John T Mentzer: Supply Chain Management, Sage Publications, 2008
6. Donal Waters: Global Logistics, Kogan Page, 2009
7. Christain schuh et al: The purchasing chess board,

Springer link, 2009.

8. Philip B.Schary, Tage Skjott-Larsen: Managing the Global Supply Chain, Viva, 2008.
9. Joel D wisner, Keong Leong, Keah Choon Tan: Principles of Supply Chain Management- A Balanced approach, Cengage Learning, 2008
10. Rahul V Altekar: Supply Chain Management, Concepts and Cases, PHI , 2008
11. J.L.Gattorna and D.W.Walters: Managing the Supply Chain, Macmillan, 2008
12. Rangaraj: Supply chain Management for competitive advantage, TMH, 2009
13. Kachru: Logistics and Supply Chain Management, Excel, 2009
14. Shah: Supply Chain Management, Pearson, 2009

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### PGC-10 COST AND MANAGEMENT ACCOUNTING

The objective of the course is to enable the students the components of product cost their calculation methods, and their control. Prerequisite for the course is Knowledge of Financial Accounting and Analysis taught in First Semester of the programme.

**Unit – 1:Introduction:** Management accounting Vs. Cost accounting vs. financial accounting, role of accounting information in planning and control, cost concepts and managerial use of classification of costs. The management process and accounting - Cost analysis and control: Direct

and Indirect expenses, allocation and apportionment of overheads, calculation of machine hour rate. An introduction to activity based costing and Life Cycle Costing.

**Unit – 2:Costing for specific industries:** Unit costing, job costing, cost sheet and tender and process costing and their variants, treatment of normal losses and abnormal losses, inter-process profits, costing for by-products and equivalent production.

**Unit – 3:Marginal Costing:** Introduction, Application of Marginal costing in terms of cost control , profit planning, Closing down a plant, dropping a product line, charging general and specific fixed costs, fixation of selling price, make or buy decisions, key or limiting factor, selection of suitable product mix, desired level of profits, diversification of products, closing down or suspending activities, level of activity planning- Break-even-analysis: Application of BEP for various business problems. Inter-firm comparison: Need for inter-firm comparison, types of comparisons, advantages.

**Unit – 4:Budgetary Control:** Budget, budgetary control, steps in budgetary control, Flexible budget, different types of budgets: sales budget, Cash budget, Production budget, Master budget, Performance budgets, material Vs. purchase budgets, Zero Based Budgeting. An introduction to cost audit and management audit.

**Unit – 5:Standard Costing:** Standard Cost and Standard Costing, standard costing vs. budgetary control, standard costing vs. estimated cost, standard costing and marginal costing, analysis of variance, material variance, labour variance, Sales and Profit variance.

#### References

- M.Y.Khan, P.K. Jain: Management Accounting: Theory and Problems, TMH, New Delhi, 4/e, 2008.
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- MN Arora: Cost Accounting, Vikas, 2009.
- Colin Drury: *Management and Cost Accounting*, Cengage, 2009
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- Charles T. Horngren: Cost Accounting, PHI, 2009
- James Jiambalvo: Managerial Accounting, John Wiley, 2009.
- Allen: Cases In Management Accounting & Control System, Pearson, 2009

- Bamber: Managerial Accounting, Pearson, 2009.
- Manash Gupta: Cost Accounting Principles and Practice, Pearson Education, 2008
- Blocher, Chen, Cookins, Lin: Cost Management a Strategic Emphasis, TMH,3/e 2009
- Thukaram Rao: Cost and Management Accounting, New Age International, 2008.

and organization - Social perception – Attribution Theories – Locus of control –Attribution Errors –Impression Management.

**Unit-2:** Cognitive Processes-II: Personality and Attitudes - Personality as a continuum – Meaning of personality - Johari Window and Transactional Analysis - Nature and Dimension of Attitudes – Job satisfaction and organisational commitment-Motivational needs and processes- Work-Motivation Approaches Theories of Motivation-Motivation across cultures - Positive organizational behaviour: Optimism – Emotional intelligence – Self-Efficacy.

**Unit-3:** Dynamics of OB-I: Communication – types - interactive communication in organizations – barriers to communication and strategies to improve the follow of communication - Decision Making: Participative decision making techniques – creativity and group decision making . Dynamics of OB –II Stress and Conflict: Meaning and types of stress –Meaning and types of conflict - Effect of stress and intra-individual conflict - strategies to cope with stress and conflict.

**Unit-4:** Dynamics of OB –III Power and Politics: Meaning and types of power – empowerment - Groups Vs. Teams – Nature of groups – dynamics of informal groups – dysfunctions of groups and teams – teams in modern work place.

**Unit-5:** Leading High performance: Job design and Goal setting for High performance- Quality of Work Life- Socio technical Design and High performance work practices - Behavioural performance management: reinforcement and punishment as principles of Learning –Process of Behavioural modification - Leadership theories - Styles, Activities and skills of Great leaders.

**References**

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- McShane: Organizational Behaviour, 3e, TMH, 2008
- Nelson: Organizational Behaviour, 3/e, Thomson, 2008.
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- Pareek Udai: Behavioural Process at Work:,Oxford &IBH, New Delhi, 2009.
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**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

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The objective of the course is to provide the students with the conceptual framework and the theories underlying Organisational Behaviour.

**Unit-1:** Introduction to OB - Definition, Nature and Scope – Environmental and organizational context – Impact of IT, globalization, Diversity, Ethics, culture, reward systems and organizational design on Organisational Behaviour. Cognitive Processes-I : Perception and Attribution: Nature and importance of Perception – Perceptual selectivity



- Aswathappa: Organisational Behaviour, 7/e, Himalaya, 2009
- Mullins: Management and Organisational Behaviour, Pearson, 2008.
- McShane, Glinow: Organisational Behaviour--Essentials, TMH, 2009.
- Ivancevich: Organisational Behaviour and Management, 7/e, TMH, 2008.

make them proficient in understanding the dynamics of securities market. This paper focuses on the application of theory to practice.

**Unit – 1: Investments:** The Investment environment: Classification and functions of financial markets and financial instruments. Securities Markets, how securities are traded.

**Unit – 2: Portfolio Theory and Capital market theory:** The returns and risks from investing, Markowitz Portfolio Theory, Mean-variance approach, Portfolio selection-efficient portfolios, The Single-Index Model, Asset Pricing Models-The Capital Asset Pricing Model, Arbitrage Pricing Theory.

**Unit – 3: Fixed – income Securities (Bond):** Analysis, valuation and management: Interest rates, Measuring Bond Yields, Bond pricing theorems, Convexity, duration, Passive Bond Management and active bond management strategies, Bond immunization.

**Unit – 4:**

a) **Equity: Analysis Valuation and management:** Discounted Cash-flow techniques: Balance sheet analysis, Dividend discount models, intrinsic value and market price, The P/E ratio or Earnings Multiplier Approach, Price/Book value, Price /Sales ratio, Economic value Added (EVA), The passive and Active strategy.

b) **Security Analysis:** Macroeconomic analysis, Industry and company analysis. Technical analysis.

**Unit – 5:**

a) **Derivatives:** Overview of derivative markets, option markets, option strategies and option valuation. Futures markets, strategies and pricing. Stock index futures, interest rate futures. Swaps contracts.

b) **Portfolio management: Mutual funds** - Growth of mutual funds in India, Structure. Performance evaluation of mutual funds, performance measurement with changing portfolio composition.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem

L	T	P	C
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### PGE-1 ELECTIVE – 1

#### 1. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

The objective of this course is to provide the conceptual and analytical frame work of Security Analysis and Portfolio Management and

#### References

- Prasanna Chandra: Investment Analysis and Portfolio Management, TMH, 2009.
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- William F. Sharpe, Gordon J. Alexander and Jeffery V. Bailey: Fundamentals of Investments, Prentice Hall, 2009
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- Bhat: Security Analysis and Portfolio Management, Excel, 2009.
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- John C.Hull: Options, Futures and other Derivatives, 7/e,Pearson education 2009.
- Robert A.Strong: Derivatives – An Introduction, Cengage, 2009

#### CNBC TV 18 CDs

- Systematic Investment Planning, 2008
- Wizards of Dalal Street, 2008.
- Simplifying Technical Analysis, 2005
- Derivatives, Trader Psychology, 2005
- Global Investment Gurus- Focus on India, 2006

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#### PGE-1 ELECTIVE – 1

## 2. BUSINESS INTELLIGENCE

The objective of the course is to make the students proficient in the tools and techniques of Business Intelligence making use of Data mining and Data Warehousing processes.

**Unit – 1:Introduction:** Business Intelligence from business side-Components of BI Architecture-BI Frontend- BI and Business Value- BI Market Business Query & Reporting-Production Reporting- Dash Boards-Performance Management- Success of Business Impact- Measuring Success of Business Impact-ROI-LOFT Effect

**Unit – 2:Data Management and BI Organizing for Success** Data Quality-Data Architectures-Master Data Management- Right Time Data-Business IT partnership- Hybrid IT-Business person. **BI organizing for Success:** Requirements driven BI-Relevance to Continental Gate Agents- Waterfall Development process- Agile Development Techniques-Enterprises Vs Department BI-Business Intelligence Competency Centre-BICC Guiding Principles

**Unit – 3:Market Intelligence:** Knowledge most important asset of a company- Market Research Function with organization- Nature & Scope of Qualitative Data – Designing Research – Managing Results – Knowing Future.

**Unit – 4:BI Through Data Warehousing:** Online Analytical Processing (OLAP)- OLAP& OLTP systems- Data Modeling-OLAP tools- Managed Query Environment-OLAP tools in open Source domain. Data Warehousing (DW) to Data Mining (DM)-- Data base Segmentation-Tools for Data mining – Application of DW and DM

**Unit – 5:Future of BI:** Emerging Technologies-Predicting future-BI search and Text Analysis-Advanced Visualization- Rich Reportlets – The future beyond technology.

#### References

- Cindi Howson: Successful Business Intelligence, Tata McGraw Hill, 2008
- Turban:Business Intelligence,Pearson, 2009.
- Martin Callingham: Market Research, Kogan Page,2004
- C.S.R.Prabhu: Data Warehousing, 3/e,PHI Learning,2008
- George M.Markas: Decision Support Systems,2/e,Pearson Education,2008
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- Berson Smith: Data Warehousing, Data Mining 7 OLAP, Tata McGraw-Hill, 2007
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- Marakas: Modern Data Warehousing, Mining, and Visualization Core Concepts Pearson Education,2008
- Carlo Verelise: Business Intelligence & Data Mining, Wiley-2009

## PGE-1 ELECTIVE – 1

### 3. MARKETING COMMUNICATIONS

The objective of this course is to make the student proficient in promoting an organization through advertising and branding in contemporary styles.

**Unit – 1:** Introduction to Marketing Communications and Advertising: Marketing Communication – Integrated Marketing Communication (IMC)- IMC in Marketing Mix –Structure of Advertising World- Purpose and Function of Advertising in Marketing Mix – Advertising and Psychology – Advertising and Buying Behavior – Advertising Strategy- Planning & organization – Setting objectives – level of decision making- Creative Strategy & Execution.

**Unit – 2: Managing Advertising :** Advertising planning – Target Marketing – Defining prime prospects – planning and positioning Advertising – Setting objectives- DAGMAR Approach to set objectives – Arriving and allocating Budgets – Measuring IMC Performance – Media Function – Basic Media Strategy – Using Various Media (Television, Radio, Newspapers & Magazines)- New Trends in Advertising – Creating Advertising- Effects of Advertising.

**Unit – 3 : Advertising and Branding:** Brand Planning- Managing Brands with current trends of Advertising – Competing Brands- Global Advertising Agencies and Global markets-Advertising Agency Management. Implication for Communication and Promotional strategies  
**Branding:** Product Concept –Unique Selling proposition – Product Management – Product & STP-Reverse Engineering – Framing Product Line

**Unit – 4: Branding Concepts:** Managing Brand power – Brand Life Cycle – Brand Associations- Brand Extension- Brand loyalty-Brand Positioning.-Brand Response – Brand Experience – Brand Aesthetics – Awareness & Brands – Brand Elements – Brand Positioning pit falls – Brand Repositioning- Symbiotic Branding – Directness and Subtlety in Advertising appeal.

**Unit – 5: Brand Extension** Strategies in Indian Context – Branding Commodities- Brand Perception and Brand Strategy – Subtleties and Celebrities – Brand Equity and pricing decisions – Cost to Server Consumers – Service Quality and Branding – Retailing impact on branding – Online Brand Equity and Offline Brand Equity.

JNTUH COLLEGE OF ENGINEERING HYDERABAD

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- W.Rolan Lane, Karen Whitehill King, J. Thomas Russell: Advertising Procedure, 16/e, Pearson, 2008
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- Sharma & Singh , Advertising, PHI,2009.
- Kumar:Consumer Behaviour and Branding: Concepts, Readings and Cases-The Indian Context, Pearson-2009.
- Murthy& ,Bhojanna: Advertising an IMC: Excel, 2009.
- R.C.Bhatia: Marketing Communication and Advertising, Paragon International,2009.
- Mahendra Mohan: Advertising Management, Tata McGraw Hill, 2008
- Batra: Advertising Management, 6/e, Pearson Education, 2008
- Jason Hartman: Brand of Chocie, Jaico, 2009
- Terence A Shimp: Advertising and Promotion, Cengage Learning,2007
- Rodney D Ryder: Trademarks, Advertising and Brand Protection, Macmillan, 2009

**CDs (EXCEL MULTIMEDIA)**

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**PRODUCT BRANDS  
 TO COMPANY  
 BRANDS**

**BAWARE RAVI, SEN ANAND**

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**TRUE NATURE OF  
 BRANDING  
 THE THIRD WAVE OF  
 BRANDING**

**Building Successful  
 Brands in  
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 Studies (NCMS), AIMA

**CNBC TV 18 CDs**

- Strategies for becoming Customer Focused Organisation
- Brands that made India 2008
- Most Trusted Brands, 2006

**CONNECTING  
 ACROSS  
 GENERATIONS  
 CREATING INDIAN  
 BRANDS**

1936, Minimum Wages Act, 1948, The Payment of Bonus Act, 1965, National wage policy – Contemporary issues in Wage systems.

**Unit -5:**Labour Legislation II: Industrial Disputes Act, 1948 - Grievance Handling Employee Grievances – Causes of Grievances –Conciliation, Arbitration and Adjudication procedural aspects for Settlement of Grievances –Standing Orders- Code Discipline. Industrial Disputes: Meaning, nature and scope of industrial disputes - Cases and Consequences of Industrial Disputes –Prevention and Settlement of industrial disputes in India- Employee Participation - Quality of Work Life- Managing good industrial relations.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem

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### PGE-1 ELECTIVE – 1

#### 4. MANAGEMENT OF INDUSTRIAL RELATIONS

The objective of the course is to give a good understanding of dynamics of Industrial Relations against the backdrop of monitoring and regulatory environment in India.

**Unit -1:**Industrial Relations : Economy and the Labour Force in India – Approaches to Industrial Relations – Industrial Relations in Comparative Frame work- Management and Employer organizations – Introduction – origin and growth. Trade Unions- introduction-Definition and objectives- growth and structure of Trade Unions in India-Trade Unions Act , 1926 and Legal framework-Union recognition-Union Problems- Non-Union firms –Management of Trade Unions in India.

**Unit -2:**Collective Bargaining: Nature and legal framework of collective bargaining – Levels of Bargaining and Agreements- Change in the Labour-management relations in the post-liberalised India- Changes in the legal frame work of collective bargaining, negotiated flexibility, productivity bargaining, improved work relations, public sector bargaining and social security – Negotiating techniques and skills –drafting of an agreement.

**Unit -3:**Tripartism and Social Dialogue: Types and levels of Tripartism – social dialogue and the Reform Process – Strengthening tripartite social dialogue – Role of government in industrial relations.

**Unit -4:**Labour Legislation-I –Factories Act, 1948, Workmen's Compensation Act, 1923, ESI Act, 1948- The Payment of Wages Act,

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- C S Venkataratnam: Management of Industrial Relations, Oxford University Press, 2009.
- Memoria and Gauskar: Dynamics of Industrial Relations, Himalaya, 2009
- Arun Monappa: Industrial Relations, TMH, 2009
- Tapamoy Deb:Managing Human Resources & Industrial Relations, Excel,2009
- B D Singh: Industrial Relations & Labour Laws, Excel, 2009.
- Sinha: Industrial Relations, Trade Unions and Labour Legislation, Pearson, 2009.
- P.K.Padhi: Labour and Industrial Laws, PHI, 2009.
- B D Singh: Industrial Relations, Excel, 2009

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**IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem**

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**PGE-2 ELECTIVE – 2**

**1. DERIVATIVES**

The objective of this course is to make students efficient in the area of Derivatives, giving them the knowledge of basics in Derivatives, Future Markets, Option Strategies, etc.

**Unit I: Introduction to Derivatives** – Development and Growth of Derivative Markets, Types of Derivatives, Uses of Derivatives, Fundamental linkages between spot & Derivative Markets, The Role of Derivatives Market, Uses & Misuses of derivatives.

**Unit II: Future and Forward Market** structure of forward and Future Markets, Mechanics of future markets, Hedging Strategies, Using futures, Determination of forward and future prices, Interest rate futures, Currency futures and Forwards.

**Unit III: Options** – Distinguish between Options and Futures, Structure of Options Market, Principles of Option Pricing, Option Pricing Models: The Binomial Model, The Black – Scholes Merton Model.

**Unit IV: Basic Option Strategies**, Advanced Option Strategies, Trading with Options, Hedging with Options, Currency Options.

**Unit V: Swaps** – Concept and Nature, Evolution of Swap Market, Features of Swaps, Major types of Swaps, Interest Rate Swaps, Currency Swaps, Commodity Swaps, Equity Index Swaps, Credit Risk in Swaps, Credit Swaps, using Swaps to Manage Risk, Pricing and Valuing Swaps.

**References**

- Jayanth Rama Varma: Derivatives and Risk Management, TMH, 2008.
- John C Hull: Options, Futures and other derivatives, 7<sup>th</sup> Edition, Pearson , 2009
- Mishra: Financial Derivatives, Excel, 2009.
- S.L.Gupta: Financial Derivatives: Theory, Concepts and Problems, Prentice Hall, 2009
- S.S.Kumar; Financial Derivatives, PHI, 2009
- David A. Dubofsky, Thomas W Muller, TR: Derivatives Valuation and Risk Management, Oxford, 2008
- Don M Chance, Robert Brooks: Derivatives and Risk Management Basics, Cengage, 2008.
- A.N.Sridhar: Futures and Options, Equities & Commodities, Shroff Publishers and Distributors, 2008.

Organising Function, Staffing Function, Leading Function, Controlling Function, Some Features of Information Systems Auditing.

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- 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.
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IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem

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### PGE-2 ELECTIVE – 2

#### 2. INFORMATION SYSTEMS CONTROL & AUDIT

The objective of the course is to provide students with a knowledge of control of Information Systems and Audit. The prerequisite for the course is knowledge of ERP & MIS.

**Unit -1:**Overview of Information System Auditing-Conducting an Information Systems Audit, Overview & steps in an Audit.

**Unit -2:**The Management Control Framework-I: Introduction, Systems Development Management Controls, Security Management Controls, Operations management Controls, Quality assurance Management Controls.

**Unit -3:**The Application Control Framework-I : Boundary Controls, Input Controls, Processing Controls, Database Controls, output Controls.

**Unit -4:**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 -5:**Information Systems Audit and Management: Managing the Information Systems Audit Function, Introduction, Planning Function,

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**IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem**

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**PGE-2 ELECTIVE – 2**

**3. INTERNATIONAL MARKETING**

The objective of the course is to provide students with a perspective of International Marketing Management, its environment and complexities. The prerequisite for the course is Marketing Management taught in II semester.

**Unit -1:**International Marketing: Scope and Significance of International Marketing, the strategic importance of international marketing , Differences between international and domestic marketing . Need for international trade, trends in foreign trade. International market environment - Business Customs in International Market.

**Unit -2:**Canalising and targeting international market opportunities: regional market Characteristics, Marketing in transitional economies and third world countries, international market segmentation and targeting. International Market Entry Strategies: Indirect Exporting, Domestic Purchasing, Direct Exporting , Foreign Manufacturing Strategies Without Direct Investment, Foreign Manufacturing Strategies With Direct Investment. Entry Strategies of Indian Firms.

**Unit -3:**International product management: International product positioning, Product saturation Levels in global Market, International product life cycle, Geographic Expansion–Strategic Alternatives. New products in Intentional Marketing, Product and culture, brands in International Market.

**Unit -4:**International Marketing Channels: channels –Distribution Structures, Distribution Patterns, Factors effecting Choice of Channels, the Challenges in Managing An international Distribution Strategy Selecting Foreign Country Market intermediaries. The management of physical distribution of goods.

**Unit -5:**Pricing and Promotion for international Markets: Environmental influences on Pricing Decisions , Grey Market goods, Transfer pricing, Global Pricing – Policy Alternatives. Global Advertising and brandy, selecting an advertising agency. Personal selling, Sales Promotion, Public Relations and Publicity, Sponsorship Promotion. Export Policy Decisions of a firm, EXIM policy of India. Export costing and pricing, Export procedures and export documentation. Export assistance and incentives in India.

**References**

- Philip R. Cateora, John L. Graham: International Marketing, Tata McGraw-Hill Co. Ltd., 2009.
- Mathur: International Marketing, Sage, 2009
- Roger Bennett & Jim Blythe: International Marketing Strategy Planning Market Entry & Implementation, Kogan, 2009.
- Francis Cherunillum: International Marketing, Himalaya, 2009.
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- Sak Onkvisit, John J. Shaw: International Marketing Analysis and Strategy, 3/e, Pearson, 2009.
- Isobel Doole and Robin Lowe: International Marketing Strategy, 2/e, Cengage, 2009.
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### IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem

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### PGE-2 ELECTIVE – 2

#### 4. PERFORMANCE MANAGEMENT

The objective of the course is to provide an outline of performance management of individuals in the organization. The prerequisite for the course is knowledge of HRM.

**Unit 1:** Introduction to performance management, planning performance for role clarity, accountability and effectiveness, increasing self awareness and understanding: Self Appraisal, performance analysis. *Bharat Petroleum Corporation Ltd.:* Aligning people to business goals, Performance Management System in *Titan*.

**Unit 2** Improving quality of performance ratings, Performance Review Discussion, Using Performance Management Systems, Data for HR Decision and Performance Improvements, Performance Management Systems and Appraisal Practices in India, Performance Management Systems and Appraisal Practices in some Asian Countries. Performance Management System in *Infosys*, Performance Management System in *Dr.Reddy's Laboratories*

**Unit 3:** Making Performance Management Systems and Appraisals Work, Monitoring Performance Planning Analysis and Development Systems, Focusing on Team Performance for Better Results. Performance Management System in *National Stock Exchange*,

Performance Planning Development Review and Management System: *NOCIL*.

**Unit 4:** Rating-Less Appraisals for the future of performance management systems, Performance Management : From Systems to Spiritual Approach, Implementing Performance Management Systems.

**Unit 5:** Strategies for performance management, Competency Mapping, Benchmarking. **Case Studies** -Integrating 360 degree Feedback with Performance Management System : *TISCO*, 360 Degree or Multirater Assessment and Feedback Systems, Potential Appraisal.

#### References

- T.V.Rao: Performance Management and Appraisal Systems, Response, 2008.
- Herman Aguinis: Performance Management, Pearson Education, 2009.
- T.V.Rao: 360 Degree Feedback and Assessment and Development Centres, Excel, 2005.
- Kandula: Performance management, PHI, 2009.
- Michael Armstrong: Performance Management, Kogan Page, 2007.
- A.S.Kohli, T.Deb: Performance Management, Oxford Higher Education, 2008.
- Dinesh K Srivastava: Strategies for Performance Management, Excel, 2005.
- Prem Chedda: Performance Management Systems, MacMillan, 2008.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem**

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**PGE-3 ELECTIVE –3**

**1. STRATEGIC INVESTMENT AND FINANCING DECISIONS**

The objective of the course is to provide students with a knowledge of investment and Financing decisions from the strategic perspective. The prerequisite for the course is Financial Accounting and Analysis and Financial Management.

**students need to be provided with discounting and statistical table for examination**

**Unit -:**Investment decisions under conditions of Risk and uncertainty: Concepts of risk and uncertainty. Risk Analysis in Investment Decisions. Risk adjusted rate of return, certainty equivalents, probability distribution of cash flows, decision trees, sensitivity analysis and Monte Carlo Approach to Simulation. Investment Decisions under capital constraints: Capital Rationing Vs. Portfolio. Portfolio Risk and diversified projects.

**Unit -2:**Types of Investments and disinvestments: Project abandonment decisions, Evidence of IRR. Multiple IRR, Modified IRR, Pure, simple and mixed investments. Lorie Savage Paradox. Adjusted NPV and impact of inflation on capital budgeting decisions.

**Unit -3:**Critical analysis of appraisal techniques: Discounted pay back, post pay back, surplus life and surplus pay back, Bail-out pay back, Return on Investment, Equivalent Annual Cost, Terminal Value, single period constraints, multi-period capital constraint and an unresolved problem, NPV mean variance analysis, Hertz Simulation and Hillier approaches. Significance of information and data bank in project selections.

**Unit -4:**Strategic Analysis of selected investment decisions: Lease Financing, Leasing Vs. Operating Risk, borrowing vs. procuring. Hire purchase and Instalment decisions. Mergers and acquisitions in Capital Budgeting, cash vs. equity for financial mergers.

**Unit -5:**Financing Decisions: International Capital Structure: Modigliani Miller Model: Hamada Model of Market Risk: The Miller Model: The Trade-Off Models and Agency Costs: Capital Structure Theory –the Signaling Model.

**References**

- Prasanna Chandra: Financial Management, 7/e, TMH, 2008
- Vishwanath, Corporate Finance, Sage, 2009
- Alan Shapiro: Capital Budgeting and investment Analysis, Pearson, 2008.
- Prasanna Chandra: Projects: Planning, Analysis, Financing Implementation and Review, 6/e ,TMH, 2008
- Brigham & Ehrhardt: Financial Management, Text and Cases, Cengage, 2005.
- James P. Lewis: Project Planning, Scheduling and Controlling,3/e,TMH 2004.
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- MY Khan and PK Jain: Financial Management: Text, Problems & Cases, TMH, 2008.
- Richard Pike &Bill Neale: Corporate Finance & Investment—Decisions and Strategies, 2/e, PHI, New Delhi, 2008.
- Alexander: Fundamentals of Investment 3/e Pearson,2008
- Robert A Haugen: Modern Investment theory, 5/e, Pearson,2009.
- Titman:Valuation, Pearson, 2009

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem**

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**PGE-3 ELECTIVE –3**

**2. DECISION SUPPORT SYSTEMS**

The objective of the course is to provide an understanding of Decision Support System for Management decisions. The prerequisite for the course is knowledge of ERP & MIS.

**Unit 1:** Decision- Making and Computerized support- Management support systems – Managerial Decision Making and Information Systems – Computerized Decision support and supporting technologies - Decision-Making Systems - Modeling, and Support

**Unit 2:** Decision Support System – Decision support systems configurations - The knowledge based management system – The Decision Support system Hardware – Decision support system classifications - Modeling and Analysis – Certainty, Uncertainty and Risk - Management support system modeling – Decision Analysis and alternatives – Multiple goals, Sensitivity analysis and Goal seeking - DSS Development

**Unit 3:** Developing Decision Support systems and Deterministic Models, the DSS Development Methodology – Decision Support Systems

Technology levels and tools - Models Required to Cope With Uncertainty, Probabilistic Models and Fuzzy Sets, Fuzzy DSS and Fuzzy Expert DSS.

**Unit 4:** Application of DSS to Some Functional Areas of Management Like Finance, Marketing, Production Planning and Control Etc. Feasibility of DSS Technical's and Financial viability

**Unit 5:** Non-Optimising Models of DSS and Intelligent Decision Support systems – Artificial Intelligence – Concepts of Expert systems – Problems and limitations of Experts systems – Expert systems success factors- Knowledge acquisition - Simulation Techniques and Monte- Carlo Methods.

**References**

- Macllah: Decision Support Systems and Data Warehousing, Tata McGraw-Hill , 2000.
- Efraim Turban, Jay E. Aronson, Ting-Peng Liang: DSS and Intelligent Systems, Pearson Education, 2009
- Stevenson: Introduction to Management Science, Tata McGraw-Hill, 2008.
- James A Obrien, George M Marakas: Management Information systems, 7/e, Tata McGraw-Hill, 2008.
- George M..Marakas: Decision Support Systems in the 21<sup>st</sup> Century, 2/e, PHI, 2008.
- Anderson: Introduction to Management Science & Quantitative techniques for Decision Making, Cengage, 2009
- Hiller, Lieberman: Operations Research: Concepts & Cases, 8/e, Tata McGraw-Hill , 2008.

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**IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem**

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**PGE-3 ELECTIVE –3**

**3. SALES AND DISTRIBUTION MANAGEMENT**

The objective of this course is to provide students a wonderful of opportunity of learning the basics and concepts of Sales Management and Distribution Management.

**Unit 1: Introduction:** Evolution of Sales Management- Nature and importance of Sales Management- Roles, Types and Skills of Sales Managers- Sales Objectives, Strategies and Tactics- Emerging Trends in Sales Management- Linking Sales and Distribution Management- Psychology in Selling- Buying Decision- Sales Knowledge and Sales Related marketing policies- Sales Process- Transactional and Relationship Selling.

**Unit 2: Management of Sales-I :** Strategic Planning- Role of Marketing & Sales- Marketing & personal selling Strategies – Sales Strategy – Developing sales forecast-Forecasting approaches- Sales budget-Defining sales territories-Procedures for designing territories- Assigning territories to people- Managing Territories-Sales Quotas.

**Unit 3: Management of Sales – II:** Concepts of Sales Organisation-Types of Sales organization structures- Specialization within sales organization- Sizing and Staffing the Sales force – Training and Motivating Sales Force- Compensating and Leading Sales force- Sales force expenses – Marketing audit- Sales force audit- Evaluation of sales org- Evaluating and controlling the performance of sales force.

**Unit 4: Distribution Management:** Definition- Need for Distribution Management- Need for Distribution Channels – Value addition of Distribution Management- Marketing Channels- Channel Formats-Relationship of flows to service levels – Channel levels – Service Channels- retailer as a salesman – Trading /Retail Formats – E-Tailing – Wholesale – Functions & Classification – Major Wholesaling decisions-Distributors- Dealers/ Stockists.

**Unit 5: Designing Channel Systems:** Channel Design factor – Channel planning process – Ideal Channel structure – Training, Motivating & Evaluating Channel members- Channel Design Comparison – Implementation – Vertical Integration – Channel Management – Power & Conflict – Principles of Channel Management – Channel Information System- International Sales and Distribution Management.

**References**

- Krishna K Havaldar & Vasant M Cavale: Sales and Distribution Management, TMH, 2007
- Chunawala: Advertising, Sales and promotion Management, HPH, 2009
- S L Gupta: Sales and distribution Management, Excel, 2009.
- Tanner : Sales Management, Pearson, 2009.
- Donald J. Bowersox & M. Bixby Cooper: Strategic Marketing and Channel Management, TMH, 2008
- John F Tanner Jr, Earl D Honeycutt Jr & Robert C Erffmeyer: Sales Management, Pearson Education, 2009.
- Pran Choudhury, Ricky Elliott & Alan Toop: Successful Sales Promotion, Orient Longman Limited,1998
- Subhash C Jain: Marketing Strategy, Cengage, 2008
- Kazmi: Marketing Management, Excel, 2007
- Coughlan:Marketing Channels, Pearson, 2009

systems relationships – systems diagramming and mapping, influence charts, multiple cause diagrams- A multidisciplinary approach- Cases Chipping Away at Intel, Nestle, Boeing.

**Unit -3:**Change Diagnosis & Resistance to Change : Diagnosis Models and Component Analysis – diagnosing readiness to change- Resistance to change: Factors contributing to resistance, cognitive and affective processes, recognizing resistance, Managers as resistors to change - suggestions to manage resistance- Cases-Problems at Perrier, Innovations at Wipro.

**Unit -4:**Implementing change: Organisation Development - Meaning, Nature and scope of OD - Dynamics of planned change – Person-focused and role-focused OD interventions –Planning OD Strategy – Implementing change through OD, Appreciative inquiry and sense-making approaches- Contingency and Processual Approaches to implementing change- Change at Dupont, British Airways Swipe Card Debacle, Implementing Tata Business Excellence Model in Tata Steel

**Unit -5:**Linking vision and Change: Content of meaningful vision – Strategies for communicating change- Consolidating change: Actions to consolidate to change – Signs of consolidation of change - caution to be observed- Cases, Roel of Vision at Mentor Graphics.

**Note: Cases in Reference 1 and 2.**

#### References

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- Mike Green: Change management, Kogan Page, 2009.
- V.Nilakant and S.Ramnarayan: Managing Change, Response Books, New Delhi, 2009.
- Radha R Sharma: Change Management—Concepts and Applications, TMH, 2009
- Robert A Paton and James McCalman: Change Management: A Guide to Effective Implementation 2/e,Response 2009.
- Harvard Business Essentials: Managing Change and Transition, HBS Press, 2007.
- Thorn Hill: Managing Change,Pearson,2009.
- Joseph W. Weiss: Organisational Behaviour and Change--Managing Diversity, Cross cultural dynamics and Ethics. Cengage, 2009.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

IDP (B.Tech. CSE. & M.Tech. /MBA) V Year I-Sem

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PGE-3 ELECTIVE –3

### 4. MANAGEMENT OF CHANGE

The objective of the course is to enable students understand how to cope up with the changes that take place constantly in business. The prerequisite for the course is knowledge of HRM and Organisational Behaviour subjects.

**Unit -1:**Change Management: Introduction, An overview of change, Forces of Change, Types of Change, change models, change programmes – change levers-Change as growth – change as transformation – change as turnaround – Value-based change Cases- A Hewlett Packard Change Story: Managing a Merger, An IBM Change Story: Transformational Change from below and above, A McDonald's Change Story: Responding to Pressure.

**Unit -2:**Mapping and diagnosing change: The role of diagramming in system investigation – A review of basic flow diagramming techniques –

- Harvard Business Essentials: Coaching and Mentoring, HBS Press, 2009.
- Passmore, Stefan: Appreciative inquiry for change Management, Kogan Page, 2009
- French: Organizational Development and Transformation, 6/e, TMH, 2009

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<b>CNBC CDs TV18</b>	

Some Inspirational Movies from Management perspective (Management of Change)

<b>English</b>	<b>Hindi</b>	<b>Telugu</b>
Gladiator	LAGAN	Sye
Goal-I	IQBAL	Gamyam,
Goal-2	Lakshya	
Victory	Swadesh	
<b>10,000 BC</b>	Guru	
United <b>93</b>		

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**IDP (B.Tech. CSE. & M.Tech. /MBA) V Year II-Sem**

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**PGC-12 STRATEGIC MANAGEMENT**

The Objective of the course is to enable students have a grasp of various business strategies in general and functional management areas. It will provide a strategic orientation in conduct of the business. Prerequisite The subjects such as Management Theory and Practice, Financial Management, HRM, Marketing Management, Production and Operations Management taught in First and Second Semesters of the programme.

**Unit - 1:** Introduction- Concepts in Strategic Management, Strategic Management Process, Developing a strategic vision, Mission, Objectives, Policies – Factors that shape a company's strategy, Environmental Scanning: Industry and Competitive Analysis – Methods. Evaluating company resources and competitive capabilities – SWOT Analysis – Value Chain Analysis and Competitive advantage.

**Unit – 2:**Tools and techniques for strategic analysis - Porter's Five Force Model, BCG Matrix, GE Model, TOWS Matrix, IE Matrix, The Grand Strategy Matrix. Market Life Cycle Model - and Organisational Learning, Impact Matrix and the Experience Curve, Generic Strategies- Strategy Formulation - Types of Strategies – offensive strategy, defensive strategy, Exit and entry barriers - Tailoring strategy to fit specific industry and company situations.

**Unit – 3:**Strategy Implementation: Strategy and Structure, Strategy and Leadership, Strategy and culture connection - Operationalising and institutionalizing strategy - Strategies for competing in Globalising markets and internet economy - Organisational Values and Their Impact on Strategy – Resource Allocation as a vital part of strategy – Planning systems for implementation.

**Unit – 4:**Turnaround and Diversification Strategies: Turnaround strategy - Management of Strategic Change, strategies for Mergers, Acquisitions, Takeovers and Joint Ventures - Diversification Strategy : Why firms diversify, different types of diversification strategies, the concept of core competence, strategies and competitive advantage in diversified companies and its evaluation.

**Unit – 5:**Strategy Evaluation and control – Establishing strategic controls for Measuring performance – appropriate measures- Role of the strategist – using qualitative and quantitative benchmarking to evaluate performance - strategic information systems – problems in measuring performance – Guidelines for proper control- Strategic surveillance -strategic audit - Strategy and Corporate Evaluation and feedback in the Indian and international context.

**References**

- Gregory Dess and G.T. Lumpkin: Strategic Management – Creating Competitive Advantage, TMH, 2009.
- Thompson & Strickland: Strategic Management, Concepts and Cases. TMH, 2009.
- Saloner: Strategic Management, Wiley 2009
- P.Subbarao: Strategic management, Himalaya, 2009
- Subbaro Ch: Compete or Forfeit—Competitive Strategies for Pharmaceutical Industry, PharmaMed Press, 2009.
- VSP Rao: Strategic Management, Excel, 2009
- Johnson:Exploring Corporate Strategy, Pearson, 2009
- Hitt, Ireland & Hoskisson: Management of Strategy, Thomson 2009

- Allan Afuah, Business Models: A Strategic Management Approach, TMH, 2009
- Ranjan Das: Crafting the Strategy: Concepts and Cases in Strategic Management, TMH,2009.
- Fred R.David: Strategic Management Concepts and Cases, PHI, 2009
- Hill: Strategic Management an Integrated Approach, Biztantra, 2009
- Azhar Kazmi: Business Policy & Strategic Management: TMH, 2009.
- Ajit Prasad: Extremely Short cases in Strategic Management, Excel-2009
- Wheelen & Hunger: Concepts & Cases in Strategic Management and Business Policy, Pearson 2009.

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<p><b>OJHA NIKHIL P</b></p>	<p><b>ENHANCED COMPETITIVENESS – AN ANTIDOTE TO MANAGING FUTURE, MANAGING THE FUTURE – EVERLASTING TAKEAWAYS</b></p>
<p><b>GIANETTI PRETI VYAS,</b> Chairperson – Vyas Gianetti Creatives <b>STEVENS ERIC</b> Prof of Marketing, ESCM B School, France</p>	<p><b>DESIGN AS A STRATEGIC DIFFERENTIATOR</b></p>
<p><b>CHANDRASEKHAR S</b> President HR, Reliance Industries Limited DUBEY RAJEEV Executive Vice-President, M&amp;M.</p>	<p><b>SPEED &amp;AGILITY</b></p>
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**70 MILLION EMPLOYABLE INDIANS:**

**STRATEGIES FOR GLOBAL**

**SHAHANI NAIDU  
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**DEVELOPING THE**

**MANAGER**

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IDP (B.Tech. CSE. & M.Tech. /MBA) V Year II-Sem**

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## PGE-4 ELECTIVE-4

## 1. INTERNATIONAL FINANCIAL MANAGEMENT

The objective of the course is to provide students with a broad view of International Monetary Systems and its understanding to enable a global manager to do business in a global setting. The prerequisite for the course is Financial Accounting and Analysis and Financial Management.

- **Discounting and Statistical tables need be provided to students for examination.**

**Unit -1:International Financial Management:** An overview, Importance, nature and scope, Theories of International business, International Business Methods, Recent changes and challenges in IFM - International Flow of Funds: Balance of Payments (BoP), Fundamentals of BoP, Accounting components of BOP, Factors affecting International Trade flows, Agencies that facilitate International flows. Indian BoP Trends.

**Unit -2:International Monetary System:** Evolution, Gold Standard, Bretton Woods system, the flexible exchange rate regime, evaluation of floating rates, the current exchange rate arrangements, the Economic and Monetary Union (EMU).

**Unit -3:Foreign Exchange Market:** Function and Structure of the Forex markets, major participants, types of transactions and settlements dates, Foreign exchange quotations, process of arbitrage, speculation in the forward market - Currency Futures and Options Markets, Overview of the other markets – Euro currency market, Euro credit market, Euro bond market, International Stock market.

**Unit -4:Exchange Rates:** Measuring exchange rate movements, Factors influencing exchange rates. Government influence on exchange rates – exchange rate systems. Managing Foreign exchange Risk. International arbitrage and interest rate parity. Relationship between inflation, interest rates and exchange rates – Purchasing Power Parity – International Fisher Effect – Fisher Effect.

**Unit -5:Asset–liability Management:** Foreign Direct Investment, International Capital Budgeting, International Capital structure and cost of capital. International Portfolio Management. International Financing: Equity, Bond financing, parallel loans - International Cash management, accounts receivable management, inventory management. Payment methods of international trade, trade finance methods, Export – Import

bank of India, recent amendments in EXIM policy, regulations and guidelines.

## References

- S.Eun Choel and Risnick Bruce: International Financial Management, TMH, 2009
- T. Siddaiah: International Financial Management, Pearson, 2009
- Alan C.Shapiro: Multinational Financial Management, John Wiley, 2009.
- Jeff Madura: International Corporate Management, Cengage, 2009.
- V.A Avadhani: International Financial Management, HPH, 2008
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- P.K Jain: Josette Peyrard and Surendra S. Yadav, International Financial Management, Macmillan, 2009.
- P.G.Apte: International Financial Management, TMH 2009.
- Maurice D.Levi: International Finance, TMH, 2009
- Srivastava: Multinational Financial Management: Excel, 2009.
- David K. Eiteman, Arthur I.Stonehill and Michael H.Moffeth: Multinational Business Finance, 10<sup>th</sup> edition, Pearson Education 2009.
- Ephraim Clark: International Finance, Cengage, 2009
- Reid W. Click & Joshva D.Coval: The Theory and Practice of International Financial Management. Prentice Hall India, 2009.

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**PGE-4 ELECTIVE-4**

**2. TOTAL QUALITY MANAGEMENT**

The objective of this course is to facilitate students appreciate the quality concepts and develop an understanding of tools and techniques relating to total quality management.

**UNIT-1: Principles and Practices-I:** Introduction,- Gurus of TQM,- Historic Review,- Benefits of TQM- Leadership, characteristics of Quality leaders.-The Deming Philosophy-Quality councils-Strategic Planning-Customer Satisfaction-Customer perception of Quality-service Quality,- Customer Retention- Employee Involvement-Employee survey-Empowerment-Gain sharing-Performance Appraisal.

**UNIT-2: Principles and Practices-II:** Continuous process Improvement,- the Juran trilogy,- The PDCA Cycle-Kaizen- Reengineering. Supplier Partnership- Partnering-Sourcing-Supplier Selection-Supplier rating-Performance Measures-Basic concept-Strategy-Quality cost- Bench marking- reasons for bench marking-Process-Understanding current performance-Pitfalls and criticism of benchmarking.

**Unit-3:Tools and Techniques-I:** Information Technology-Computers and the quality functions-Information quality Issues-Quality management System-Benefits of ISO registration-ISO 9000 series Standards-Internal Audits. Environmental Management System-ISO 14000 series-Benefits of EMS- Relation to Healthy and safety-Quality Function Deployment-The voice of the Customer- Building a House of Quality-QFD Process.

**UNIT-4:Tools and Techniques-II:** Quality by Design- Benefits-Communication Model-Failure Mode and Effective Analysis-Failure Rate, FMEA Documentation-The process of FMEA Documentation-Product liability-Proof and Expert Witness. Total Productive Maintenance-promoting the Philosophy and Training-Improvements and needs-Autonomous Work groups.

**UNIT-5: Management Tools:** Management Tools,-Introduction-Forced field Analysis-Tree diagram- Process decision Program Chart-Statistical Process Control-Cause and Effect diagram-Histogram-state of control – Process Capability- Experimental Design-Hypothesis-Orthogonal Design-

Two factors and Full factors-Quality Strategy for Indian Industries-Quality Management in India.

**References**

- Howard S Gilton, Alan J Oppenheim: Quality Management, TMH, 2008.
- Dale H.Besterfeild, carlon Besterfeild: Total Quality Management, Pearson Education, 2008
- Sridhara bhat: Total Quality Management Texts and Cases, Himalaya, 2009.
- Shailendra Nigam: Total Quality Management, Excel, 2009
- Kanishka Bedi: Quality Management, Oxford, 2008.
- James R.Evans, M.Lindsay: The Management and Control Of Quality, Cengage, 2009.
- Pradeep V.Mehta:Introduction to Quality Assurance-New Age publication, 2008.

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**PGE-4 ELECTIVE-4**

**3. KEY ACCOUNT MANAGEMENT**

The objective of this course is to make students more competent in taking care of maintaining major or key accounts/clients. This course offers the knowledge of managing large and Key Accounts which has become the key functionality of Corporate Marketing.

**Unit-1: Introduction:** Account Management- Big Picture Strategy- Targeting your large account – Buy Sell Hierarchy (Levels of Business Relationship)-setting your strategy-Basic principles.

**Unit-2: Strategic Analysis:** Charter Statements – Goals – Focus Investments- Stop Investments – Revenue targets – Pre-Action Overview.

**Unit – 3: Situation Appraisal :** Selecting right accounts (Preparing the ground) – Account Summary- Account view Situation – Accounts trends & opportunities-Strengths and Vulnerabilities – Key account plan – Timetable and Performance

**Unit – 4 : Key Account Management & Customer Perspective:** Supplier positioning – Becoming key supplier – Measuring Value – Measuring Trust – Supplier Power/ Trust Model – Understanding business strategy, Culture and Values.

**Unit – 5: Preparing and Entering Key Account Management:** Goals and Obstacles- Process and Systems- Organization and Resources-Buying decision process- Decision making units – Key account management – e revolution.

**References**

- Robert e miller, Stephene Heiman & Tad Tuleja: Successful Large Account Management, 3/e Kogan Page, 2005
- Symonds: Global Account Management- Kogan, 2002.
- Noel Capon: Key Account Management & Planning, The Free press,2001
- Jim Blythe: Sales & Key Account Management, Cengage, 2009
- Peter Cheverton, Tim Hughes, Bryan Foss & Mertin Stone: Key Account Management, Kogan page, 2005
- Malcom Mc Donald and Diana Wood Burn : Key Account Management, BH publishers, 2/e, 2007.

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**PGE-4 ELECTIVE-4**

**3. TRAINING AND DEVELOPMENT**

The objective of this study is to specialize the HR students in the process of Training and Development

**Unit 1 : Training Choices and Dynamics** : What is training?, Assumption for prevailing and alternative concepts of training, action through training or action through force, culture and other contexts, training strategy, overview of training process. Establishing the objectives and preparing the partners, Organizational collaboration through clarifying needs, two dilemmas of development, clarifying individual motivation for training, seven system functions with candidates for training.

**Unit 2 : Designing the Program**-Designing the successive approximations, five steps in program design, outlining programme sequences and themes, composing the detailed syllabus, modular approach to programme design, building in flexibility, monitoring and improving training during the programme, training schedules and time tables.

**Unit 3 : Training Methods**- Two faulty juxtapositions, events-reflection-experience, learning on the job – nine training requirements methods, training methods compared with objectives, learning process and facilities, *Developing Group And The Climate*: the social process – three aspects, indicators of group development, the training climate, *Trainers And Training Style*: Personal needs of trainers, power and influence, trainers realness under pressure, trainers role, trainers style, *Post training support for improved performance at work*.

**Unit 4: Evaluation of Training** : Issues for evaluation, role of the training system with evaluators from other constituencies, *Training And Training System Development*- system goals and approaches to system development, tasks of the training system, the dynamics of developing training systems, *Training Centre And Like Institutions*- Characteristics,

dilemmas, consistent learning environment for participants, institutional climate for trainers, trainers language of resistance, crises dilemmas and resolution in institution development, the training centre in its environment, *Action Research For Better Training*- Action research by trainers, some questions for trainers to study, trainers-researchers.

**Unit 5 : Training instruments** – Self-assessment exercise- Self Awareness Questionnaires, Fundamental Interpersonal Relations Orientation – Behavior (FIRO-B), Setting goals for subordinates, coaching counseling and mentoring, empowering people through delegation, working with teams, creative problem solving.(Reference 2)

**References**

- Raymond A Noe: Employee Training and development, TMH, 4/e,2008.
- Rolf P Lynton, Udai Pareek: Training for Development, Vistaar Publications, 2008.
- G Pandu Naik: Training and development, Excel Books,2007.
- P.Nick Blanchard, James Thacker: Effective Training, Pearson Education , 3/e,2009.
- Stephen P.Robins: Training in Interpersonal Skills, PHI,4/e,2008.

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### PGE-5 ELECTIVE-5

#### 1. PREDICTIVE ANALYTICS

Predictive analytics is an area of statistical analysis that deals with extracting information from data and using it to predict future trends and behavior patterns. Predictive analytics is being increasingly used in [insurance](#), [telecommunications](#), [retail](#), [travel](#), [healthcare](#), [pharmaceuticals](#) and other fields. Here, the focus is on developing models that process a customer's [credit history](#), [loan application](#), customer data, etc., in order to rank-order individuals by their likelihood of making future credit payments on time.

**Internal Evaluation (for 40 Marks) for this paper will be based on Lab performance on SPSS17.0 Predictive Analytics Software Statistics.**

##### **Unit 1: Introduction to Predictive analytics and Time series analysis**

Introduction: Introduction to Predictive analytics: Definition, Types of predictive models, Applications of Predictive analytics Areas of application, Objectives of time series analysis, Component of time series, Descriptive analysis. Distributional properties: Independence, Autocorrelation, Stationary. Probability models to time series: Random walk, Autoregressive model. Moving Average model, mixed models, parameter estimation, Diagnostics. Forecasting: Optimal forecasts, Forecasts for ARMA models, Exponential Smoothing forecasting method.

##### **Unit 2 Regression and Logistic regression**

Importance of Regression Analysis, Key principles and features of Regression Analysis- Measuring associations using correlations, Building simple linear regression models - Extension to many variables – Multiple Regression, Concepts of Logistic Regression Addressing business problems using Logistic Regression, applying Logistic Regression for best effect

##### **Unit 3 Customer/ Product Segmentation and Cluster analysis**

Introduction to classification and clustering: visualization techniques, including principal components and multidimensional scaling. Methods of

cluster analysis, graphical outputs, identification of outliers and determination of optimal number of clusters -Business benefits of segmentation- Key issues in segmentation- Define objective of segmentation- Identification of base for segmentation (people vs businesses vs occasions, global vs local)- Identification and development of input variables (needs, behaviours, demographics)- Selection of appropriate segmentation approach- Analytic issues (stability testing, outliers etc)- Creating allocation models for databases- Segmentation techniques—pros and cons

**Unit 4 Simulation and Revenue forecasting:** Process of Simulation, Monte Carlo Method, Waiting Line-Simulation Method, , Marketing Management Simulation, Special Techniques Of Marketing Research, The role of demand forecasting in revenue management, develop various extrapolative forecasting methods , measuring forecast error and compare different forecasting methods.

##### **Unit 5 Customer Reporting & Profiling through Data Mining:**

Development of customer profile - their needs and wants - competitive analysis of the business and listing competitors-• List the strengths and weakness in terms of the products/services offered. Customer value, models for increasing its value/satisfaction/quality, Sourcing and analysing customer relevant data.

##### **References**

- Donald.R.Cooper and Pamila.S.Schindler: Marketing Research Concept & Cases, TMH, 2006.
- Malhotra, Naresh: Marketing Research: An Applied Orientation, 5/e, Pearson, 2009.
- Gilbert A. Churchill and Dawn Iacobucci: Marketing Research-- Methodological Foundations, 9/e, Cengage, 2005
- Aaker, David, V. Kumar and George Day: Marketing Research, 8th edition, John Wiley & Sons,1995.
- Dillon, William R., Madden, Thomas J., and Firtle, Neil H: Essentials of Marketing Research, 1/e Richard D. Irwin, Inc, 1993.
- Phillips, Robert: Pricing and Revenue Optimization, Stanford University Press 2005.
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- Zikmund: Essentials of Marketing Research, Cengage Learning, 2007
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**PGE-5 ELECTIVE-5**

**2. MANAGEMENT INFORMATION SYSTEM (MIS)**

The objective of the course is to provide the basic concepts of Enterprise Resource Planning and Management of Information System.

**Unit – 1: Introduction to IS Models and Types of Information systems** – 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. Types of Information Systems

**Unit – 2: 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 – 3: 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, ERP Market- 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 – 4: Benefits of ERP:** Reduction of Lead Time, On-Time Shipment, Reduction in Cycle Time, Improved Resource Utilisation, Better Customer Satisfaction, Improved Supplier Performance, Increased

Flexibility, Reduced Quality Costs, Improved Information Accuracy and Design Making Capabilities.

**Unit – 5: ERP Implementation and Maintenance:** Implementation Strategy Options, Features of Successful ERP Implementation, Strategies to Attain Success, User Training, Maintaining ERP & IS. Case Studies.

**References**

- Gordon B. Davis & Margrethe H.Olson: Management Information Systems, TMH, 2009.
- C Laudon and Jane P.Laudon, et al: Management Information Systems, Pearson Education, 2009.
- Alexis Leon: ERP (Demystified), 5/E, Tata McGraw-Hill, 2009.
- C.S.V.Murthy: Management Information System, Himalaya, 2009
- James A. Obrein: Management Information Systems, TMH, 2009
- David L Olson: Managerial Issues of Enterprise Resource Planning Systems, McGraw Hill, International Edition-2009.
- Rainer, Turban, Potter: Introduction to Information Systems, WILEY-India, 2009.
- Vaman, ERP in Practice, TMH, 2009
- Dharminder and Sangeetha: Management Information Systems, Excel, 2009
- Gerald V.Post, David L Anderson: Management Information Systems, Irvin McGraw Hill, 2009.
- Monk: Concepts in ERP, Cengage, 2009
- Olson: Managerial Issues of ERO, TMH, 2009
- Motiwala: Enterprise Resource Planning, Pearson 2009
- Miller: MIS—Cases, Pearson, 2009

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**PGE-5 ELECTIVE-5**

**3. RETAILING MANAGEMENT**

The objective of the course is to enable students to develop a deeper insight into the functioning of Retailing Sector with a special focus on merchandising and store management.

**Unit -1:Introduction:** Advent of retailing -Functions of retailing - Types of retailing -Customer buying behavior-Retailing Strategy: Target market & Retail format - Growth strategies - Strategic retail planning process - Factors to be considered for retail planning. Human resources & Administrative Strategy: Designing the organizational structure for retail firm - Retail organization structures.

**Unit -2:Merchandising and pricing strategies:** Merchandize planning - Sources of merchandize -Category Management - Buying systems to stores - Allocation of merchandize- Retail pricing strategies –Approaches for setting pricing – Pricing adjustments – Using price to stimulate retail sales – Promoting the merchandise – Implementing an advertising plan.

**Unit -3:Store Management:** Objectives of a good store design –Store design – Store layout – Space planning – Merchandise presentation techniques and atmospherics.

**Unit -4:Location strategies:** Shopping centers –Freestanding sites – Location and retail strategies- Factors affecting the demand for a region or trade area –Factors affecting the attractiveness of a site.

**Unit -5:Retailing in India:** The present Indian retail scenario – Factors affecting retailing in India – Region wise analysis of Indian retailing – Retailing opportunities in India. CRM in retail management, prompt delivery, customer satisfaction after sales service etc.

**References**

- Levy & Weitz: Retailing Management , TMH, 2009.
- Fernie: Logistics & Retail Management, Kogan Page, 2009
- Arif sheik: Retail Management, HPH,2008
- Sivakumar:Retail Management, Excel, 2009
- A.J.Lamba: The art of Retailing, TMH, 2009.
- Andrew J Newmann & Petes Cullen: Cengage Learning, 2009.
- Barry Berman Joel &R Evans: Retailing Management-A Strategic Approach, Pearson Education, 2009.
- Swapna Pradhan: Retailing Management Texts & Cases, TMH, 2009
- Diamond: Retail Buying, Pearson, 2009
- Sathish Taneja: Franchising, Paragon International, 2009

**CDs (EXCEL MULTIMEDIA)**

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**TITLE**  
**THE**  
**CHANGING**  
**FACE OF**  
**RETAILING IN**  
**INDIA**

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PGE-5 ELECTIVE-5

### 4. COMPENSATION MANAGEMENT

The objective of this course is to specialize the HR students in the process of Compensation and Reward Management. The prerequisite for this course is Human Resource Management offered in 2<sup>nd</sup> semester.

**Unit 1: Evaluating, pricing and analyzing jobs and roles :** The approach to job evaluation, job evaluation in action, equal pay for work of equal value, conducting pay and benefit surveys and competency analysis.

**Unit 2 : Pay Structures-** Pay structures purpose and types, graded pay structures, broad banding, rewarding individual and team contributions and organizational performance, performance related pay, performance management and rewards, shop floor incentive schemes, skill based pay, competency related pay, team rewards, relating rewards to organizational performance, non financial rewards.

**Unit 3: Employee benefits,** allowances and pension schemes, Managing the reward system for special groups, rewarding directors and senior executives, international pay and expatriates rewards, rewarding sales staff, managing reward systems, managing rewards with the help of computers.

**Unit 4: Cases studies** – The case of temperamental talent, High performance through Participative Management, When and Executive Defects, Empowerment that came undone, Team Based Compensation: The HR Manager's Dilemma. (Reference 2)

**Unit 5: Case Studies** – Performance based compensation structure in Crompton Greaves Ltd., Performance Management System at Bharti Telecom, EVA Incentive Scheme: The TCS Approach and Experience. (Reference 3)

### References

- Milkovich, Newman: Compensation Management, Tata McGraw Hill, 2009
- Michael Armstrong: Employee Reward, Oxford University Press, 2008
- Tapomoy deb: Compensation Management, Excel Books, 2009
- Goel: Performance Appraisal and Compensation Management: A Modern Approach, PHI, 2009
- Henderson: Compensation Management, Pearson-2008.
- B D Singh: Compensation and reward System, Excel Books, 2007.
- Sunil Bakshi: Compensation Management, Paragon International, 2009.
- Marticho: Strategic Compensation, Pearson, 2008.
- Dr. Sakshi Vasudeva: Compensation Management, Paragon International, 2009



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**PGE-6 ELECTIVE-6**

**1. FINANCIAL MODELING**

The objective of this course focuses on modeling as a generalized subject, regardless of the functionality a participant comes from. The course will focus on conceptualizing relationships that apply to variables in a given situation and the manipulation of variables for an end-objective. Participants will take part in a project to create a financial model from scratch by programming Excel and in the process, applying theory to practice.

**Unit 1:** Introduction to Financial modeling-Types of financial models – Model Design – Identifying the purpose and mode of use of Model – Flat payment schedules-Future values and applications – Multiple Internal Rates and Return- How financial models work.

**Unit 2:** Financial Statement Modeling – Modeling and Projecting the financial statements – Project Finance- Debt Repayment schedules – Projecting the income statement – Projecting the Balance statements – Projecting the cash flow Statements.

**Unit 3:** Valuation: Introduction to Financial Valuation – Importance of Valuation – Building Financial model – Deriving Free cash flows – Weighted average cost of capital – Sensitivity analysis - Comparable Company Analysis – Discounted Cash flow analysis.

**Unit 4:** Portfolio Models: Calculating Portfolio means and variances – Using Excess return matrix in Spread Sheet – Ways of calculating Variance-Covariance matrix – Estimating Betas and Security market line.

**Unit 5:** Risk Modeling: Value at Risk – Option payoff and profit patterns - Credit Risk modeling – Option pricing models.

**References**

- Benninga, Simon: Financial Modeling, 2/e, Massachusetts Institute of Technology Press, 2001
- Benninga Simon: Financial Modeling, 3/e Massachusetts Institute of Technology Press,2008
- Chandan Sengupta: Financial Modeling Using Excel and VBA, Wiley Finance,2004.
- Marshall & Bansal: Financial Engineering: A complete Guide to Financial Innovation, PHI, 2009.
- Subbarao & Parvateesam: Financial Engineering, Excel, 2009
- Michael Rees: Financial Modeling in Practice, Wiley Finance, 2008
- K Scott Proctor: Building Financial Models with Microsoft Excel: A Guide of Business Professionals, Wiley Finance,2004
- Keith A Allman: Modeling Structured Finance Cash flows With Microsoft Excel: astep by step guide, Wiley Finance, 2007
- Thomas S. Y.Ho, Sang Bin Lee: The Oxford Guide to Financial modeling-- Applications for Capital Markets, Corporate Finance, Risk Management and Financial Institutions, Oxford University Press, 2004.

Building a project Team, Characteristics of a Effective project Team, achieving cross- functional co-operation, virtual project teams, Conflicts management, Negotiations

#### **UNIT-5 Performance Measurement and Evaluation**

Project control cycles, monitoring project performances, Earned value management, Human factors in project Evaluation and control, Project termination, Types of project terminations, Project management and future current and future trends in project management.

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**IDP (B.Tech. CSE. & M.Tech. /MBA) V Year II-Sem**

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#### **PGE-6 ELECTIVE-6**

### **2. PROJECT MANAGEMENT**

The objective of this course is to lay an important foundation to students in managing projects with a special focus on every phase such as project planning, execution, monitoring and evaluation.

#### **UNIT-1 Introduction**

Introduction-Project management-What is Project Management-why Project Management-Project Lifecycle- Project Management Research in brief, Project Management today, Organization strategy and structure and culture, Forma of organization structure, stake holder management, organization culture, creating a culture for Project Management.

#### **UNIT-2 Project Planning**

Project Planning Defining the project, Approaches to project screening and selection, Work breakdown structure, financial Module, Getting Approval and compiling a project charter, setting up a monitoring and controlling process.

#### **UNIT-3 Project Execution**

Initiating the Project, Controlling and Reporting project objectives, conducting project Evaluation, Managing Risk-Four Stage Process , risk management an integrated approach, cost Management, Creating a project Budget.

#### **UNIT-4 Leading Project Teams**

#### **References**

- Gray, Larson: Project Management-Tata McGraw Hill-2008
- Enzo Frigenti: Project Management-Kogan, 2008
- Jeffery K.Pinto: Project Management-Pearson Education-2009
- Larry Richman: Project Management-PHI, 2008
- Scott Berkun: Project Management, SPD, 2008
- Thomas M.Cappels: Financially Focused Project Management, SPD,2008.
- Anita Rosen: Effective IT Project Management-PHI-2008.
- R. Panneerselvam, P. Senthilkumar: Project Management, PHI, 2009
- Guide to Project Management Body of Knowledge (PMBOK® Guide) of Project Management Institute, USA.

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IDP (B.Tech. CSE. & M.Tech. /MBA) V Year II-Sem

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### PGE-6 ELECTIVE-6

#### 3. RURAL MARKETING

The objective of this course is to offer students a beautiful opportunity to learn about the emerging Marketing technique Rural Marketing. The present corporate world is eagerly waiting for professionals in Rural Marketing of their products and hence the course attains a huge importance. The prerequisite for this Course is Marketing Management which are being taught in 1st semester.

**Unit – 1: Introduction:** Meaning - Evolution – Rural Marketing Models – Rural Marketing Vs Urban Marketing – Nature and Characteristics of Rural Market – Indian Rural Market – Parameters differentiating Urban & Rural Market - Differences in consumer behavior in Rural and Urban market.

**Unit – 2 : Rural Market Research:** Challenges & Opportunities in Rural Marketing – Need and Wants of Consumer Behaviour – Factors influencing Rural consumers during purchase of product – Rural consumer Life style – Rural market research – Evolution of Rural Market Research – Methods and Sources of Data Collection – Data Collection tools-Limitations and Challenges in Rural Market Research.

**Unit – 3: Rural Marketing Mix:** Rural Marketing Mix – Additional Ps in Rural Marketing – 4As of Rural Marketing Mix – New Product Development for Rural Market – Rural Market Product Life Cycle – Objectives behind new product launch – New Product development process.

**Unit – 4 : Rural Market Brand & Channel Management:** Brand Loyalty in Rural Market – Regional Brands Vs National Brands – **Channel Management** – Indian Rural Retail Market – Rural Retail Channel Management – Strategies of Rural Retail Channel Management.

**Unit – 5:** Innovation for Rural Market – Marketing Strategies – e –Rural Marketing – Agricultural Co – operative Marketing – Rural Market Mapping – Corporate Social Responsibility – Organised Rural Marketing – IT for Rural Development – e-Governance for Rural India.

#### References

- Balram Dogra & Karminder Ghuman: Rural Marketing, TMH, 2009
- C K Prahlad:Bottom of the Pyramid, Pearson, 2009
- C.S.G.Krishnamacharyulu, Lalitha Ramakrishnan: Rural Marketing: Text and Cases, Pearson Education, 2009
- Kaushik Sircar: Rural Marketing, Himalaya,2008
- U.C.Mathur: Rural Marketing, Excel, 2009
- R.V.Badi and N.V.Badi: Rural Marketing, Himalaya,2008
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**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IDP (B.Tech. CSE. & M.Tech. /MBA) V Year II-Sem**

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**PGE-6 ELECTIVE-6**

**4. ENTREPRENEURSHIP AND GOOD GOVERNANCE**

The objective of the course is to make students understand the nature of entrepreneurship, and to motivate the student to start his/her own enterprise. The objective of the course is to enlighten with the fragrance of Corporate Good Governance and Business Ethics, so that they would become the best entrepreneurs / managers of the corporate world.

**Unit 1: Nature of Entrepreneurship;** Characteristics, Qualities and skills of an Entrepreneur, functions of entrepreneur, Entrepreneur scenario in India and Abroad. Forms of Entrepreneurship: Small Business, Importance in Indian Economy, Types of ownership, sole trading, partnership, joint stock company and other forms. First-Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies and Managing Newness.

**Unit 2: Aspects of Promotion:** Generation of new entry opportunity, SWOT Analysis, Technological Competitiveness, legal regulatory systems, patents and trademarks, Intellectual Property Rights- Project Planning and Feasibility Studies- Major steps in product development. Financial Aspects: Sources of raising Capital, Debt-Equity, Financing by Commercial Banks, Government Grants and Subsidies,

Entrepreneurship Promotion Schemes of Department of Industries (DIC), KVIC, SIDBI,NABARD, NSIC, APSFC, IFCI and IDBI. New Financial Instruments.

**Unit 3: Introduction to Business Ethics:** Necessity for Business Ethics-Need for Ethical guideline – Salient Issues in Ethics and Commerce- Ethics as a Luxury – Earlier attempts at Ethics in Industry – Justification for Ethics – Effect of Migration of National Character – Shadow Economy – Basic Principles in Ethics –Corporate Climate and corporate climate audits – Political Issues – Nature and theory of Ethics – The Naturalistic fallacy – G.E.Moore’s Philosophy.

**Unit 4: Understanding Corporate Governance:** Corporate Governance- Capitalism at crossroads – Historical perspective of Corporate Governance – Issues of Corporate Governance – Theoretical basis of Corporate Governance – Corporate Governance mechanisms – Indian Model of Governance – Good Corporate Governance – Corporate Governance committees – OECD Principles – Indian Committee and guidelines – The confederation of Indian Industry’s initiative. Corporate Governance Models, Corporate Social Responsibility.

**Unit – 5: Corporate Social Responsibility:** System Concept of Business Society – Social Responsibility – Social Responsibility tools – approaches to Ethics – Corporate Social Accountability – Business in a Social World – Ethics and Social Responsibility – professional ethics – Ethics of practicing company secretaries- Ethical investing.

**References**

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- C.S.V.Murthy: Business Ethics & Corporate Governance, Himalaya, 2009.
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- Tripat Kaur: Values and Ethics in Management, 2/e, Paragon International,2009.

**CDs (EXCEL MULTIMEDIA)**

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**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**IDP (B.Tech. CSE. & M.Tech. /MBA) V Year II-Sem**

**PROJECT WORK**

Students are required to work the entire II semester of V year on the project even as they undergo the assigned course work of this semester. The students can choose specific problem of Industry or Industry based project work. Alternatively it can be secondary source based or Field based project work. Before they commence the project work it is suggested that they write a synopsis indicating the objectives, Methodology, Framework for analysis, Action plan with milestones in order to have clarity for their subsequent work. The project should have an internal faculty as guide.

**References**

- Business Essentials: *Research Project*, Viva, 2009
- Paul Oliver: *Writing Your Thesis*, Sage, 2009
- M.K.Rampal & S.L.Gupta: *Project Report Writing*, Paragon International,2009
- Michael Jay Polonsky: David S Waller: *Designing and Managing a Research Project*, Sage, 2009
- Surendra Kumar: *An Aid to Project Work*, Paragon International, 2009.