

**ACADEMIC REGULATIONS  
COURSE STRUCTURE  
AND  
DETAILED SYLLABUS**

**COMPUTER SCIENCE & ENGINEERING**

*For*

**B.TECH. FOUR YEAR DEGREE COURSE**  
*(Applicable for the batches admitted from 2011-2012)*



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

Kukatpally, Hyderabad – 500085  
Andhra Pradesh, India



**JNTUH COLLEGE OF ENGINEERING HYDERABAD  
(Autonomous)  
Kukatpally, Hyderabad. 500085**

**ACADEMIC REGULATIONS 2009 FOR B.TECH. REGULAR COURSE**

(Effective for the students admitted into I year from the  
Academic Year **2009-2010** and onwards)

**1. Award of B.Tech. Degree**

A student will be declared eligible for the award of the B. Tech. Degree if he fulfils the following academic regulations:

- i. **Pursued a course of study for not less than four academic years and not more than eight academic years.**
- ii. Registered for **200 credits** and secured **200 credits**

**2.** Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course.

**3. Courses of study**

The following courses of study are offered at present for specialization for the B. Tech. Course:

Branch Code	Branch
I.	Civil Engineering.
II.	Computer Science and Engineering.
III.	Electrical and Electronics Engineering.

IV.	Electronics and Communication Engineering.
V.	Mechanical Engineering .
VI.	Metallurgical Engineering

**4. Distribution and Weightage of Marks**

- i. The performance of a student in each semester shall be evaluated subject –wise with **a maximum of 100 marks for theory and 75 marks for practical subject.** In addition, an Industry oriented mini-project, Seminar, Comprehensive viva-voce, and Project Work shall be evaluated for **50, 50 and 200 marks** respectively.
- ii. For theory subjects the distribution shall be **25 marks for Internal Evaluation** and **75 marks for the End-Examination.**
- iii. For theory subjects, during the semester there shall be **2 midterm examinations.** Each mid term examination consists of **objective paper for 10 marks** and **subjective paper for 15 marks** with a **duration of 110 minutes (20 minutes** for objective and **90 minutes** for subjective paper). Objective paper shall be set with multiple choice questions, true/false, fill-in the blanks, matching type questions, etc. for **10 marks.** Subjective paper shall contain 5 questions of which the student has to answer 3 questions, each of 5 marks. The first mid term examination shall be conducted for the first 50% of the syllabus and second mid term examination shall be conducted for the remaining 50% of the syllabus. The total marks secured by the student in each mid term examination for 25 marks is considered and **the better of the two** mid term examinations shall be taken as the final marks secured by each candidate.
- 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 at the end of the semester by the laboratory teachers.

- v. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation, the distribution shall be **25 marks for internal evaluation (15 marks for day-to-day work and 10 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 marks for internal tests.
- vi. There shall be an **industry-oriented mini-Project**, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. The **mini project shall be evaluated during the IV year I Semester**. The industry oriented mini project shall be submitted in report form and should be presented before a committee, which shall be evaluated for **50 marks**. The committee consists of Head of the Department, the supervisor of mini project and a senior faculty member of the department. There shall be **no internal marks for industry oriented mini project**.
- vii. There shall be a **seminar presentation in IV year II Semester**. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by a Departmental committee consisting of the Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for **50 marks**. There shall be **no external examination for seminar**.
- viii. There shall be a **Comprehensive Viva-Voce in IV year II semester**. The Comprehensive Viva-Voce will be conducted by a Committee consisting of the Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects he studied during the B.Tech course of study. The Comprehensive Viva-Voce is evaluated for **50 marks** by the Committee. There are **no internal marks for the Comprehensive viva-voce**.
- ix. The Project work shall be started by the student in the beginning of the IV year I Semester. Out of a total of **200 marks** for the project work, **50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination**. The End Semester Examination (viva-voce) shall be conducted by a committee comprising of an external examiner, Head of the Department and the project supervisor. The evaluation of project work shall be conducted at the end of the IV year II Semester.

The **Internal Evaluation shall be on the basis of a seminar given by each student on the topic of his project. The seminar shall be conducted at the time of the I Mid-Semester examinations of IV year II Semester.**

#### 5. Attendance Requirements:

- i. A student shall be eligible to appear for the end semester examinations if he acquires a **minimum of 75% of attendance in aggregate of all the subjects** for semester.
- ii. Condonation of shortage of attendance in aggregate **up to 10% (65% and above and below 75%)** in a semester may be granted based on medical grounds with sufficient medical proof.
- iii. A student will not be permitted to write the end examination and hence not promoted to the next semester unless he satisfies the attendance requirement of the present semester, as applicable. They may seek re-admission for that semester when offered next.
- iv. Shortage of Attendance **below 65% in aggregate** shall in **NO case be condoned**.
- v. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that semester.
- vi. A stipulated fee shall be payable towards condonation of shortage of attendance.

#### 6. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.5.

- i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project, if he secures **not less than 35% (26 out of 75 marks) of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together**.

- ii. A student shall be **promoted from II to III year** only if he fulfils the academic requirement **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.
- iii. A student shall be **promoted from III year to IV year** only if he fulfils the academic requirements of 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 for 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.
- iv. A student shall register and put up minimum academic requirement in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.
- v. Students who fail to earn 200 credits as indicated in the course structure **within eight academic years** from the year of their admission shall **forfeit their seat** in B.Tech course and their **admission shall stand cancelled**.

**7. Course pattern:**

- i. The entire course of study is of four academic years. **All the I, II, III & IV years are on semester pattern .**
- ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the supplementary examination whenever conducted.
- iii. 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.**

- iv. 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**

**8. Grading Procedure :**

- (i) Marks will be awarded to indicate the performance of each student in each Theory Subject or Practicals or Seminar or Project or Comprehensive Viva-voce etc., as specified in item 4 above, 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

<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

**9. Award of Degree or Class:**

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

<b>Class Awarded</b>	<b>% of marks to be secured</b>	From the aggregate marks secured for the 200 Credits.
First Class with Distinction	70% and above	
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%	
Fail	Below 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

#### 10. 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.

#### 11. Transitory Regulations :

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

#### 12. Minimum Instruction Days:

The minimum instruction days for each semester shall be **90 clear instruction days**.

#### 13. There shall be **no branch transfers** after the completion of admission process.

#### 14. There shall be **no transfer among the Constituent Colleges and Units** of Jawaharlal Nehru Technological University, Hyderabad.

#### 15. General:

- Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
- The academic regulations should be read as a whole for the purpose of any interpretation.

- In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor / Principal is final.
- In the case of any error in the above rules and regulations, the decision of the Vice-Chancellor / Principal is final.
- The College may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College.

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### JNTUH COLLEGE OF ENGINEERING HYDERABAD (AUTONOMOUS)

#### 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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**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	3	1	0	4

		Languages				
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 Systems Lab	0	0	3	2
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**COMPUTER SCIENCE & ENGINEERING  
COURSE STRUCTURE**

**III YEAR**

**I SEMESTER**

S.No.	Group	Subject	L	T	P	Credits
1	DE-1	Departmental Elective-1	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
						<b>28</b>

**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
						<b>28</b>

**Summer Between III & IV Year : Industry Oriented Mini Project**

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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	DE-5	Departmental Elective – 5	4	0	0	4
3	DC	Data Mining and Data warehousing	4	0	0	4
4	OE-3	OPEN ELECTIVE – 3	4	0	0	4
5	HSS	Advanced English Language Communication Skills Lab	0	0	3	2
6	DC	Data Mining And Data Warehousing lab	0	0	3	2
7		Industry Oriented Mini Project				2
						<b>22</b>

IV YEAR		II SEMESTER				
S.No.	Group	Subject	L	T	P	Credits
1	HSS	HSS Elective	4	0	0	4
2		Seminar	0	0	3	2
3		Comprehensive Viva-voce				2
4		Major Project				14

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**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. Network Programming
2. Bio-Informatics
3. Information Retrieval Systems
4. Natural Language Processing

**Departmental Elective-5**

1. Pattern recognition
2. Speech Processing
3. Web services & service oriented architecture
4. Adhoc and Sensor Networks

**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

**Open Elective-3**

1. Applied Mechanics
2. Health Care Systems
3. e-commerce
4. Robotics
5. Quantum Computing

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**I Year B.Tech. CSE I-Sem**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

**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 B.Tech. CSE 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
7. Education / PHI
8. C Programming & Data Structures,E.Balagurusamy,TMH.
9. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
10. C& Data structures – E V Prasad and N B Venkateswarlu, S.Chand&Co.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

I Year B.Tech. CSE 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.

### 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.**
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.**

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

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### 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

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## **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.

## UNTI – 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  
Engineering Mechanics by Timoshenko & Young

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### COMPUTER PROGRAMMING & 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:

$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$

**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

- i) To find the factorial of a given integer.

- ii) To find the GCD (greatest common divisor) of two given integers.

- iii) 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:

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

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.

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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.

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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

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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.

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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

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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

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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.

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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

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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.

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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.

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.

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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.

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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.

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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

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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. Rafiqzaman John Wiley

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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.

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**3****4 0 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.

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OBJECT ORIENTED PROGRAMMING THROUGH JAVA



## UNIT I :

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

## UNIT II :

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

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

Exploring java.io.

## UNIT III

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

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

Enumerations, autoboxing, annotations, generics.

## UNIT IV :

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

The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups,

choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

## UNIT V :

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

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

## TEXT BOOKS :

1. Java the complete reference, 7<sup>th</sup> editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson education.

## REFERENCES :

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, third edition, T. Budd, pearson education.
3. Introduction to Java programming , Y. Daniel Liang, pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, eighth Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, eighth Edition, Pearson Education
7. Object Oriented Programming with Java, R.Buyya,S.T.Selvi,X.Chu,TMH.
8. Java and Object Orientation, an introduction, John Hunt, second edition, Springer.
9. Maurach's Beginning Java2 JDK 5 , SPD.
10. Programming and Problem Solving with Java, JM Slack, B S Publications.

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## INTERNET TECHNOLOGIES LAB

1. PC Network TCP/IP Configuration : Gather network information (IP address, MAC address...etc), learn to use the TCP/IP Packet Internet Groper (ping) command
2. use the Traceroute command from the workstation. Observe the name resolution occurrences using DNS servers.
3. Connecting 2 Computers together using a Crossover cable. Find out the IP address of the PC connected to your PC. Establish a Console Session with HyperTerminal using the HyperTerminal program.
4. Familiarize with common commands used to interact with switches and routers. Setting Router Passwords
5. Use *tcpdump* to observe the network traffic that is generated by issuing ping commands.
6. Capture and save network traffic with *wireshark*.

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## ADVANCED DATASTRUCTURES LAB

Objectives:

- To make the student learn a object oriented way of solving problems.
- To make the student write ADTS for all data structures.
- 

**Task 1 :** C++ programs to implement the following using an array.  
a. Stack ADT b) Queue ADT

**Task 2 :** Write C++ programs to implement the following using a singly linked list.

a) Stack ADT b) Queue ADT

**Task 3 :** Write C++ programs to implement the deque (double ended queue) ADT using a doubly linked list and an array.

**Task 4 :** Write a C++ program to perform the following operations:

a) Insert an element into a binary search tree.

b) Delete an element from a binary search tree.

c) Search for a key element in a binary search tree.

**Task 5 :** Write C++ programs that use non-recursive functions to traverse the given binary tree in

a. Preorder b) inorder and c) postorder.

**Task 6 :** Write C++ programs for the implementation of bfs and dfs for a given graph.

**Task 7 :** Write C++ programs for implementing the following sorting methods:

a) Merge sort b) Heap sort

**Task 8 :** Write a C++ program to perform the following operations

a) Insertion into a B-tree b) Deletion from a B-tree

**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

## 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

### 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.

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### 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 of Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.

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## **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 –

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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.

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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.

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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.

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#### 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*, Wirajrajuuley, 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

### 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  $\hat{1}$  transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without  $\hat{1}$  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 :

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**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

**DESIGN AND ANALYSIS OF ALGORITHMS**

**UNIT I :**

Introduction: Algorithm, Pseudo 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 Sahn 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

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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

## 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, 4digit and 8 digit BCD numbers. Take the input in consecutive memory locations and results also Display the results by using "int xx" of 8086. Validate program for the boundary conditions.
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, 4digit 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 sting
 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.

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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.

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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:**

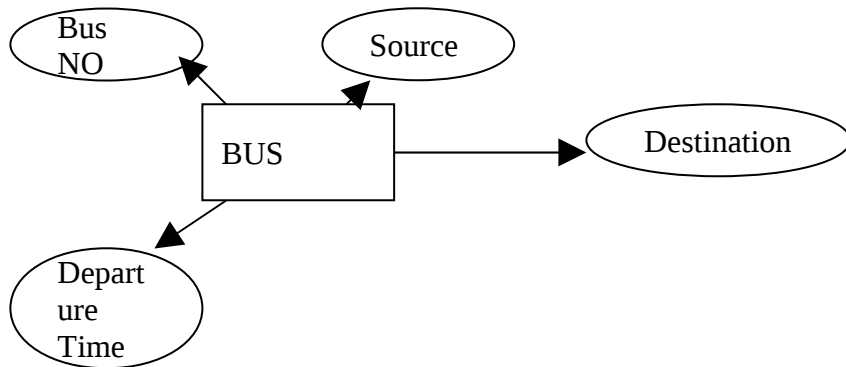
1. Ticket ID (Ticket Entity)
2. Passport ID (Passenger Entity)

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,'hyderabad','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

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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, Characteristics 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, Dezsó Sima, Terence Fountain, Peter Kacsuk ,Pearson ed.

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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 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

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



**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

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**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:**

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

**Reference books:**

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

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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..

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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

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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.

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INTELLECTUAL PROPERTY RIGHTS & CYBER LAWS  
Open Elective- 1

**UNIT-I : Introduction to Intellectual Property, Law of Trademarks, Trademark Selection & Searching**

IP Law – Types of IP - Agencies for IP Registration – International Treaties. Purpose and Function of Trademarks – Types of marks – Acquisition of Trademark Rights – Categories of marks – Trade names and Business names – protectable matter. Selection and Evaluation of a mark - Trademark search.

**UNIT-II: Trademark Registration Process, Post-registration Procedures, Trademark Maintenance, Transfer of Rights to Marks :**

Preparing and Filing the Application - Docketing Critical Dates - Examination Process - Post-examination Procedure –Registration. Affidavit of Continued Use – Affidavit of Incontestability – Renewal of Registrations – Docketing Requirements – Loss of Trademark Rights – Trademark Use and Compliance Policies – Trademark Policing and Maintenance - Use of Marks Owned by Third Parties – Transfer of Ownership or Rights in Trademarks.

**UNIT-III: Inter Partes Proceedings, Infringement, Dilution, New Developments in Trademark Law**

Inter Partes Proceedings – Infringement of Trademarks – Dilution of Trademarks – Related Trademark Claims. Protecting a Domain Name – Other Cyberspace Trademark issues.

**Law of Copyright, Subject Matter Of Copyright, Rights Afforded by Copyright Law**

Foundations of Copyright Law – Originality of Material – Fixation of Material – Exclusions from Copyright Protection – Compilations, Collections, and Derivative Works. Rights of Reproduction – Rights to Prepare Derivative works – Rights of Distribution – Rights to Perform the Work Publicly – Rights to Display the Work Publicly – Limitations on Exclusive Rights.

**UNIT-IV: Copyright Ownership, Transfers, Duration, Registration, and Searching**

Copyright Ownership Issues – Joint works – Ownership in Derivative works – Works Made for hire – Transfers of Copyright – Termination of Transfers of Copyright – Duration of Copyright. Copyright Registration Application – Deposit Materials – Application Process and Registration of Copyright – Searching Copyright Office Records – Obtaining Copyright Office Records and Deposit Materials – Copyright Notice.

**Copyright Infringement, New Developments in Copyright Law, Semiconductor Chip Protection Act:** Elements of Infringement – Contributory Infringement and Vicarious Infringement – Defenses to Infringement – Infringement Actions – Remedies for Infringement.

Copyright Protection for Computer Programs – Copyright Protection for Automated Databases – Copyright in the Electronic Age – The Digital Millennium Copyright Act – Recent Developments in Copyright Law – Terms of the Trade – Vessel Hull Protection – Semiconductor Chip Protection.

**UNIT-V: Law of Patents, Patent Searches, Ownership, Transfer**

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

**Patent Infringement, New Developments and International Patent Law**

Direct Infringement – Inducement to Infringe – Contributory Infringement – First Sale Doctrine – Claims Interpretation – Defenses to Infringement – Remedies for Infringement – Resolving an Infringement Dispute – Patent Infringement Litigation. New Developments in Patent Law – International Patent Protection – Paris Convention – Patent Cooperation Treaty – 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

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**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.

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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

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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

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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 .
3. Implement Dijkstra 's algorithm to compute the Shortest path thru a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm
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 .

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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
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 to 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 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).
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.  
h) Writing to a message queue.  
i) Reading from a message queue.

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### OBJECT ORIENTED ANALYSIS & DESIGN

#### UNIT-I

**Introduction to UML:** The meaning of Object Orientation, Object identity, Encapsulation, information hiding, polymorphism, generosity, Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture.

**Basic Structural Modeling:** Classes, Relationships, common Mechanisms and diagrams.

**Class & Object Diagrams:** Terms, concepts, modeling techniques for Class & Object Diagrams.

#### UNIT-II

**Collaboration Diagrams:** Terms, concepts, depicting a message, polymorphism in collaboration, iterated messages, use of self in messages.

**Sequence Diagrams:** Terms, concepts, depicting asynchronous messages with/without priority, call back mechanism, broadcast messages.

**Basic Behavioral Modeling:** Use cases, Use case Diagrams, Activity Diagrams.

**Advanced Behavioral Modeling:** Events and signals, state machines, processes and threads, time and space, state chart diagrams. Interactions, Interaction diagrams.

#### Unit III

**Architectural Modeling:** Component, Deployment, Component diagrams and Deployment diagrams.

**The Unified process:** use case driven, architecture centric, iterative and incremental.

**The Four Ps:** people, project, product and process.

**Use case driven process:** why use case, capturing use cases, analysis, design and implementation to realize the use cases, testing the use cases.

**Architecture-centric process:** Architecture in brief, why we need architecture, use cases and architecture, the steps to architecture, an architecture description.

#### UNIT-IV

**Iterative incremental process:** Iterative incremental in brief, why iterative incremental development? The iterative approach is risk driven, the generic iteration.

**The Generic Iteration Workflow:** Phases are the first division workflow, planning proceeds doing, risks affect project planning, use case prioritization, resource needed assess the iteration and phases.

**Inception Phase:** early in the inception phase, the archetypical inception iteration workflow, execute the core workflows, requirements to test.

#### UNIT-V

**Elaboration Phase:** Elaboration phase in brief, early in the elaboration phase ,the architectural elaboration iteration workflow, execute the core workflow –requirements to test.

**Construction phase:** early in the construction phase, the archetypal construction iteration workflow, execute the core workflow.

**Transition phase:** early in the transition phase, activities in transition phase.

**Case Study:** Automation of a Library, Simulation of a Company

#### TEXT BOOKS:

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

#### REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML,TATA McGrawHill

5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.

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**Department Elective -2**

**MOBILE COMPUTING**

**UNIT-1 : WIRELESS COMMUNICATION FUNDAMENTALS**

Introduction - Wireless transmission - Frequencies for radio transmission - Signals - Antennas - Signal Propagation - Multiplexing - Modulations - Spread spectrum - MAC - SDMA - FDMA - TDMA - CDMA - Cellular Wireless Networks.

**UNIT - 2 : TELECOMMUNICATION NETWORKS**

Telecommunication systems - GSM - GPRS - DECT - UMTS - IMT-2000 - Satellite Networks - Basics - Parameters and Configurations - Capacity Allocation - FAMA and DAMA - Broadcast Systems - DAB - DVB.

**UNIT - 3 : WIRELESS LAN**

Wireless LAN - IEEE 802.11 - Architecture - services - MAC - Physical layer - IEEE 802.11a - 802.11b standards - HIPERLAN - Blue Tooth.

**UNIT - 4 : MOBILE NETWORK LAYER**

Mobile IP - Dynamic Host Configuration Protocol - Routing - DSDV - DSR - Alternative Metrics.

**UNIT - 5 : TRANSPORT AND APPLICATION LAYERS**

Traditional TCP - Classical TCP improvements - WAP, WAP 2.0.

**TEXT BOOKS**

1. Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2003. (Unit I Chap 1,2 &3- Unit II chap 4,5 &6-Unit III Chap 7.Unit IV Chap 8- Unit V Chap 9&10.)
2. William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002. (Unit I Chapter - 7&10-Unit II Chap 9)

**REFERENCES**

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", PHI/Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003
3. Hazysztof Wesolowshi, "Mobile Communication Systems", John Wiley and Sons Ltd, 2002.

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**Department Elective -2**  
**DISTRIBUTED COMPUTING**

**UNIT – I:**

Introduction:What is distributed computing,Basic operating system concepts.Basic software engineering concepts.The Internet.Network resources and their identification: computers, services, resources, host names, host identifiers, port addresses, the domain name system, Internet addresses, Uniform Resource Locator (URL), Uniform Resource Identifier (URI).Security.Fault Tolerance.

Interprocess Communication:Basic model .Primitives (operations): connect, send, receive, disconnect.Connection-oriented/connectionless. Data marshalling: data flattening, data representation, serialization.Event synchronization.Event diagram, sequence diagram. Array of paradigms that have evolved for distributed computing.

**UNIT – II:**

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.

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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

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. Jorden H. F. and Alaghaband G., "Fundamentals of Parallel Processing"
3. M.J. Quinn, "Parallel Programming", TMH

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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.

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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 Permeh, 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 B.Tech. CSE II-Sem****L T P C**  
**4 0 0 4****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:**

Nomonotonic 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

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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

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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.

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#### 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 volums, 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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#### 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 Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

#### UNIT V:

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

#### Text Books:

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

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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.

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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 & Antisymeric 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. Johny 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.

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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. 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*
4. *Hardware/Software Introduction*" John Wiley & Sons,ISBN:0471386782,2001



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

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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 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) -

### 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.

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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
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. Than 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.

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.

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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### 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.
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

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### Department Elective-4 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)

#### 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.

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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, ClustaW, Toffee 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, PHI2006.
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

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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]  
Integrtd 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 Pearson Education

[2] Modern information retrieval; Frakes Pearson Education.

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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.

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**Department Elective-5**  
**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*", JohnWiley & Sons Inc., New York, 1992.

**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. "*Patten 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

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**Department Elective-5  
SPEECH PROCESSING**

**UNIT I**

**INTRODUCTION AND FINITE STATE TRANSDUCERS:-** Introduction: Knowledge in Speech and Language processing – Ambiguity – Models and algorithms –Language, thought and understanding - Regular expressions – Finite state automata – Regular Languages –Morphology: Survey of English morphology – Morphological parsing – Combining FST Lexicon and rules –The porter stemmer – Human morphological processing

**UNIT II**

**TEXT TO SPEECH AND PROBABILISTIC MODELS:-** Speech Sounds and Phonetic Transcription – Phonological Rules – Transducers – Advanced issues in computational phonology – Mapping text to phones for TTS – prosody in TTS – Probabilistic models: Spelling errors – Detecting Non-word errors – Bayesian method to spelling and pronunciation. Minimum Edit Distance –Weighted Automata – N-grams: Counting words – Smoothing – Back-off – Deleted Interpolation – Entropy

**UNIT III**

**SPEECH RECOGNITION AND GRAMMER:-** Architecture – Overview of Hidden Markov Models - Viterbi Algorithm - Acoustic processing – Acoustic probabilities – Speech Recognizer – Speech synthesis –

English word classes – Part of Speech Tagging – Rule Based POS tagging – Transformation Based Tagging – issues- Context Free Rules and Trees – Sentence Level Constructions – Noun phrase – Agreement – Spoken Language Syntax – Grammars and Human Processing.

**UNIT IV**

**PARSING:-** Parsing as Search – Top Down Parser – Problems – Earley Algorithm – Finite State Parsing Methods –Probabilistic Context Free Grammars – Problems with PCFGs – Probabilistic Lexicalized CFGs – Dependency Grammars – Human Parsing – Computational Desiderata for Representations - First Order Predicate Calculus –Linguistically Relevant Concepts – Alternative Approaches to Meaning.

**UNIT V**

**SEMANTIC ANALYSIS AND MACHINE TRASLATION:-** Syntax Driven Semantic Analysis – Attachments – Robust Semantic Analysis – Dialogue and Conversational Agents : Dialogue Acts – Automatic Interpretation – Dialogue Structure – Dialogue Managers in Conversational Agents – Machine Translation : Language Similarities and Differences – Transfer Metaphor – Interlingua Idea –Statistical Techniques – Usability and System Development.

**TEXT BOOK**

1. Daniel Jurafsky, James H. Martin, “*Speech and Language processing*” – Pearson Education”, 2004.

**REFERENCE BOOKS**

1. R Rabinder L and Juang B.H “*Fundamentals of Speech Recognition* “- Prentice Hall, 1993.
2. Lawrence R. Rabiner, Ronald W. Schafer,” *Digital Processing of Speech Signals*” – Prentice Hall, 1978.



## JNTUH COLLEGE OF ENGINEERING HYDERABAD

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Department Elective-5

### 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.

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**Department Elective-5**

**AD HOC & SENSOR NETWORKS**

**UNIT I**

**Introduction to Ad Hoc Networks** - Characteristics of MANETs, Applications of MANETs and challenges of MANETs.

**Routing in MANETs** - Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms, Other routing algorithms.

**UNIT II**

**Data Transmission** - Broadcast storm problem, Broadcasting, Multicasting and Geocasting.

TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

**UNIT III**

**Basics of Wireless, Sensors and Applications**

Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

**Data Retrieval in Sensor Networks**

Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

**UNIT IV**

**Security** - Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

**Sensor Network Platforms and Tools**

Sensor Network Hardware, Berkeley motes, Sensor Network Programming Challenges, Node-Level Software Platforms,

**UNIT V**

**Operating System** – TinyOS,

Imperative Language: nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

**Text Books:**

1. Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P. Aggarwal*, World Scientific Publications, March 2006, ISBN – 981-256-681-3
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)

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### DATAMINING AND DATA WAREHOUSING

#### UNIT-I

**Introduction:** Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.

**Data Preprocessing:** Need for Preprocessing the data, Descriptive data summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

#### UNIT-II

**Data Warehouse and OLAP Technology:** Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

**Data cube computation:** Efficient methods for data cube computation, Further development of data cube and OLAP technology. Data Generalization, Attribute oriented induction.

#### UNIT-III

**Association analysis:** Basic concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining Various kinds of association rules, From association mining to correlation analysis, Constraint based mining.

**Classification:** Introduction, Issues, Decision tree induction, Bayesian classification, Rule-based classification, back propagation, Support vector machines. Associative Classification, Lazy learners, genetic algorithms, roughest approach, fuzzy set approach.

#### UNIT-IV

**Prediction:** Linear, Nonlinear and other regression methods.

**Classifier/Predictor Accuracy:** Accuracy and error measures, evaluation, Ensemble methods.

**Cluster Analysis:** Introduction, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering high dimensional data, Constraint-based cluster analysis, Outlier Analysis .

#### UNIT-V

**Mining Stream, Time-series and sequence data:** Mining data streams, Mining Time-series data, Mining sequence patterns in Transactional databases. **Mining Object, Spatial, Multimedia, Text and Web data:** Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Datamining, Multimedia Datamining, Text Mining, Mning the World Wide Web.

#### TEXT BOOKS:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER , Elsevier.

#### REFERENCE BOOKS:

1. Data Mining Techniques – ARUN K PUJARI, University Press
2. Building the DataWarehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd..
3. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION
4. The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT EDITION
5. Data Mining Introductory and advanced topics –MARGARET H DUNHAM, PEA.
6. DATA MINING – TAN, VIPIN KUMAR, PEA

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**Open Elective-3**  
**APPLIED MECHANICS**

**UNIT - I Introduction of Engineering Mechanics**

Basic concepts System of Forces- Coplanar Concurrent Forces - Components in Space - Resultant- Moment of Forces and its Application - Couples and Resultant of Force System - 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 jack and differential Screw jack.

Transmission of Power-Belt Drivers - Open, Crossed and compound belt drives -length of belt - tensions - tight side - slack side - Power transmitted and condition for maximum power.

**UNIT - III Centroid and Center of Gravity**

Centroids - Theorem of Pappus- Centroids of Composite figures - Centre of Gravity of Bodies - Area moment of Inertia: - polar Moment of Inertia - Transfer - Theorems - Moments of Inertia of Composite Figures - product of Inertia - Transfer Formula for product of Inertia.

**Mass Moment of Inertia**

Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia - Mass moment of inertia of composite bodies.

**UNIT - IV Kinematics**

Rectilinear and Curve linear motion - Velocity and Acceleration - Motion of a Rigid Body - Types and their Analysis in Planar Motion.

***Mechanical Vibrations***

Definitions, Concepts - Simple Harmonic motion - free vibrations - Simple and compound pendulums - torsional vibrations.

**UNIT - V Kinetics**

Analysis as a particles and Analysis as a Rigid Body in Translation - Central Forces of motion - Equations of Plane Motion - Fixed Axis Rotation - Rolling Bodies - Work-Energy Method - Equation for Translation - Work-Energy application to Particle Motion, Connected System- Fixed axis Rotation and Plane Motion.

***TEXT BOOKS***

- (1) Engineering Mechanics, by Ferdinand L.Singer Published by Harper Collins Publishers, Singapore.
- (2) Engineering Mechanics by S.Timashenko, D.H. Young and J.V. Rao

## REFERENCES

1. Engineering Mechanics (Statics and Dynamics) by Arthur P.Boresi & Ridhard J.Schmidt - Thomson publications 2001.
2. Engineering Mechanics by A.K.Tayal, Umesh Publications
3. Engineering Mechanics - Schaum's series - Mc.Grawhill Publications.
4. Engineering Mechanics by R.C.Hibbeler; Pearson education.

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Open Elective - 3  
HEALTH CARE SYSTEMS

**UNIT I:- BASIC ECONOMICS TOOLS** Introduction , Microeconomic Tools for Health Economics , Statistical Tools for Health Economics, Economic Efficiency and Cost Effectiveness in Health Care

**UNIT II: SUPPLY AND DEMAND** The Production of Health , The Production, Cost, and Technology of Health Care, Demand for Health Capital , Demand and Supply of Health Insurance , Consumer Choice and Demand

**UNIT III: INFORMATION AND INSURANCE MARKETS** :- Asymmetric Information and Agency , The Organization of Health Insurance Markets , Managed Care

**UNIT IV: KEY PLAYERS IN THE HEALTH CARE SECTOR** :-Nonprofit Firms , Hospitals and Long-Term Care , The Physician's Practice,

Health Care Labor Markets and Professional TraininG , The Pharmaceutical Industry

**UNIT V: SOCIAL INSURANCE** :- Equity, Efficiency, and Need , Government Intervention in Health Care Markets, Government Regulation–Principal Regulatory Mechanisms, Social Insurance, Comparative Health Care Systems and Health System Reform , The Health Economics of Bads

### Text book:

Folland, "Economics of health and health care" 5 edition, pearson education.

## JNTUH COLLEGE OF ENGINEERING HYDERABAD

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Open Elective - 3  
E-COMMERCE

### UNIT-I

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

### UNIT-II

Consumer Oriented Electronic commerce - Mercantile Process models, Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

### UNIT-III

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks, Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

#### UNIT-IV

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

#### UNIT-V

Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering, Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processings, Desktop video conferencing.

#### TEXT BOOKS:

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

#### REFERENCE BOOKS:

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

### JNTUH COLLEGE OF ENGINEERING HYDERABAD

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#### Open Elective - 3 ROBOTICS

#### UNIT I

**MICROCONTROLLERS IN ROBOTS:-** Support Components – Memory and Device Programming – Interrupts – Built in Peripherals – Interfacing the controller to Robots

#### UNIT II

**SOFTWARE DEVELOPMENT:-** Source files, Object Files, Libraries, Linkers and Hex files – Assemblers – Interpreters- Compilers – Simulators and Emulators – Integrated development Environments

#### UNIT III

**THE MICROCHIP PICmicro MICROCONTROLLER:-** Different PICmicro MCU devices and features – application development tools – Basic circuit requirements –The PIC16F627 – EL Cheapo PICmicro MCU Programmer Circuit

#### UNIT IV

**THE MICROCONTROLLER CONNECTIONS:-** Hardware Interface Sequencing – Robot C Programming Template – Prototyping with the PICmicro Microcontroller – Intercomputer Communications – RS 232-Hyperterminal RS 232 Terminal Emulator – RS 232 Interface Example between PC and PCmicro MCU –Bidirectional Synchronous Interfaces – Output devices – LEDS – PWM power level control – Sensors –Whiskers for Physical Object detection – iR collision detection sensors – IR Remote controls – Ultrasonic distance measurement – Light level sensors – Sound Sensors – Odometry for Motor control and navigation –Radio control servos

#### UNIT V

**BRINGING ROBOTS TO LIFE** Real Time Operating Systems (RTOS) – Example application running in an RTOS – State Machines –Randomly moving a Robot application with IR Remote Control – Behavioral Programming – Neural Networks and Artificial Intelligence

#### TEXT BOOKS :

1. Myke Predko, “Programming Robot Controllers” – McGrawHill, 2002
2. Michael Slater, “Microprocessor – based design: A Comprehensive Guide to Effective Hardware Design”, Prentice Hall, 1989

#### REFERENCE BOOKS

1. Myke Predko, “Programming and Customizing the 8051 micro-controller”, Tata McGraw-Hill, New Delhi, 2000
2. Kenneth J.Ayala, “The 8051 Micro-controller Architecture, programming and applications”, Penram International Publishers, Mumbai, 1996
3. Murphy Robin R, “Introduction to AI Robotics”, MIT Press, 2000
4. Siegwart R. and Nourbakhsh I. R., “Introduction to Autonomous Mobile Robots” – Prentice Hall India,2005
5. Roland Siegwart, Illah R. Nourbakhsh, “Introduction to Autonomous Mobile Robots”, MIT Press,2005

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Open Elective - 3  
**QUANTUM COMPUTING**

**UNIT I  
INTRODUCTION**

Quantum bits – quantum computation – quantum gates – quantum circuits - quantum parallelism - Deutsch's algorithm — Experimental quantum Information processing – example problems.

**UNIT II  
QUANTUM MECHANICS:-** Linear operators and matrices – adjoints and Hermitian operators – tensor products – polar and singular value decomposition - state space – quantum measurement – projective measurements – superdense coding –ensembles of quantum states – EPR and Bell inequality

**UNIT III**

**QUANTUM COMPUTATION:-** Single qubit operations – Universal quantum gates – a discrete set of universal operations – quantum computational complexity – quantum simulation algorithm – perspectives on quantum simulation

**UNIT IV  
QUANTUM SEARCH ALGORITHMS:-** The oracle – the procedure – Geometric visualization – Quantum counting – Speeding up the solution of NP complete problems – Quantum search of an unstructured database – Optimality of the search algorithms

**UNIT V  
QUANTUM INFORMATION THEORY:-** Distinguishing quantum states and the accessible information – Schumacher's quantum noiseless channel coding theorem for data compression – communication over noisy quantum channel – Entanglement distillation and Quantum error correction – quantum key distribution – security of quantum key distribution.

**TEXT BOOK**  
1. M. A. Nielsen and I. L. Chuang, "*Quantum Computation and Quantum information*", Cambridge University Press 2000

**REFERENCE BOOKS**  
1. Bellac Michel Le, "*A short introduction to quantum information and quantum computation*", Cambridge University Press, 2006  
2. Vishal Sahni, "*Quantum Computing*", Tata McGrawHill, 2007.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

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**ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS 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 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 organize 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 / 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:**

- 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.
- 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:

- P – IV Processor
  - Speed – 2.8 GHZ
  - RAM – 512 MB Minimum
  - Hard Disk – 80 GB
- 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**, Aysha 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 Centers** by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

#### DISTRIBUTION AND WEIGHTAGE OF MARKS:

**Advanced Communication Skills Lab Practical's:**

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.

#### JNTUH COLLEGE OF ENGINEERING HYDERABAD

IV Year B.Tech. CSE I-Sem

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#### DATA MINING AND DATA WAREHOUSING LAB

The objective of the lab exercises is to use data mining techniques to identify customer segments and understand their buying behavior and to use standard databases available to understand DM processes using WEKA (or any other DM tool) or Clementine.

1. **Gain insight for running pre- defined decision trees and explore results.**
2. **Understand the use of data mining for evaluating the content of multidimensional cubes.**
3. **Create mining models that are executed in SQL.**  
( BI Portal Lab: The objective of the lab exercises is to integrate pre-built reports into a portal application )
4. **Publish cubes to a business intelligence portal.**  
Metadata & ETL Lab: The objective of the lab exercises is to implement metadata import agents to pull metadata from leading business intelligence tools and populate a metadata repository. To understand ETL processes
5. **Import metadata from specific business intelligence tools and populate a meta data repository.**
6. **Publish metadata stored in the repository.**
7. **Load data from heterogeneous sources including text files into a pre-defined Warehouse schema.** Case study
8. Design a data mart from scratch to store the credit history of customers of a bank. Use this credit profiling to process future loan applications.
9. Design and build a Data Warehouse using bottom up approach titled 'Citizen Information System'. This should be able to serve the analytical needs of the various government departments and also provide a global integrated view.