

**ACADEMIC REGULATIONS  
COURSE STRUCTURE  
AND  
DETAILED SYLLABUS**

B.Tech. (Revised) Four Year Degree Course (Planning) Academic Regulations  
(Effective for the students studying I year  
from the Academic Year 2002-2003 and onwards)

**COMPUTER SCIENCE  
AND ENGINEERING**

*For*

**B.TECH FOUR YEAR DEGREE COURSE**  
*(Applicable for the batches admitted from 2002-2003)*



**JAWAHARLAL NEHRU  
TECHNOLOGICAL UNIVERSITY**  
KUKATPALLY, HYDERABAD - 500 072.



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

### B.Tech. (Regular) Four Year Degree Course (Revised) Academic Regulations

(Effective for the students studying 1 year  
from the Academic Year 2002-2003 and onwards)

#### 1. Award of B.Tech. Degree:

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

- i. He has pursued a course of study for not less than four academic years and not more than eight academic years.
- ii. He has registered for and studied all the subjects for a total of 212 credits and secured all the 212 credits.
2. Students, who fail to fulfill 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 the course and their seat shall stand cancelled.

#### 3. Courses of study:

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

1. Aeronautical Engineering
2. Bio-Medical Engineering
3. Bio-Technology
4. Chemical Engineering
5. Civil Engineering
6. Computer Science and Engineering
7. Computer Science and Systems Engineering

8. Electrical and Electronics Engineering
9. Electronics and Communication Engineering
10. Electronics and Computer Engineering
11. Electronics and Control Engineering
12. Electronics and Instrumentation Engineering
13. Electronics and Telematics Engineering
14. Information Technology
15. Instrumentation and Control Engineering
16. Mechanical (Mechatronics) Engineering
17. Mechanical (Production) Engineering
18. Mechanical Engineering
19. Metallurgical Engineering
20. Metallurgy and Material Technology

and any other course as approved by the authorities of the University from time to time.

#### 4. Credits:

	Semester Pattern		Yearly Pattern	
	Periods / Week	Credits	Periods / Week	Credits
Theory	04	04	03	06
Practicals	03	02	03	04
Practicals	06	04	06	08
Project	08	08	—	—

#### 5. Distribution and Weightage of Marks:

- i. The performance of a student in each semester / 1 year shall be evaluated subject –wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, project shall be evaluated for 200 marks.
- ii. For theory subjects the distribution shall be 20 marks for Internal Evaluation and 80 marks for the End-Examination.

- iii. For theory subjects, there shall be 5 objective type tests for a duration of 20 minutes each during the semester. Each test shall contain 20 objective type questions for 20 marks. The best 4 tests will be considered for awarding 20 sessionals marks. For the I year class which shall be on yearly basis, there shall be 6 tests of the same duration and weightage as mentioned above. However, the performance in the best 4 tests will be considered for awarding 20 sessional marks.
- iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 End Examination marks. Of the 25 marks for internal, 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 and another member of the staff of the same department of the same institution.
- v. For the subject having design and / or drawing, and estimation, the distribution shall be 20 marks for internal evaluation (10 marks for day-to-day work and 10 marks for internal tests). There shall be two internal tests in a Semester and the better of the two will be taken into consideration. However in the I year class, there shall be three tests and the best two will be taken into consideration for a maximum of 20 marks. The End Examination shall be for a total of 80 marks.
- vi. The Engineering Drawing Practice Course wherever offered is to be treated as a practical course. Evaluation method adopted for practicals shall be followed here also.
- vii. Out of a total of 200 marks for the project work, 40 marks shall be for Internal Evaluation and 160 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by a board of examiners consisting of Guide, Head of the Department and an external examiner. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.
- viii. Laboratory marks and the sessional marks awarded by the College are not final. They are subject to scrutiny and scaling by the University wherever felt desirable. The uniform distribution of awarding of Sessional marks and Laboratory marks will be referred to a Committee. The Committee will arrive at a scaling factor and

the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved in the respective departments as per the University norms and shall be produced to the Committees of the University as and when they visit the College.

**6. Attendance:**

- i. A student has to put in a minimum of 75% of attendance in aggregate of all the subjects for acquiring credits in the I year and / or each semester thereafter.
- ii. Condonation of shortage of attendance in aggregate upto 10% (65% and above and below 75%) in each semester or I year may be granted by the College Academic Committee.
- iii. A student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester / I year.
- 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 / I year are not eligible to take their end examination of that class and their registration shall stand cancelled. They may seek re-admission for that semester / I year when offered next.
- vi. Condonation of shortage of attendance as stipulated in 6 (ii) above shall be granted on genuine and valid grounds with supporting evidence.
- vii. A stipulated fee shall be payable towards condonation of shortage of attendance.

**7. Minimum Academic Requirements:**

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no. 6

- 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% 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 successfully complete all the I year subjects from 3 regular consecutive examinations and 3 supplementary consecutive examinations of I year from the date of admission. If he has failed to do so he shall forfeit the seat in course and his seat shall stand cancelled.
- iii. A student shall be promoted from II to III year only if he fulfils the academic requirement of 56 credits from the consecutive regular and supplementary examinations of I year and from the regular examination of II year I semester irrespective of whether the candidate takes the examination or not.
- iv. A student shall be promoted from third year to fourth year only if he passes all the subjects of I year and fulfils the academic requirements of total 100 credits (including 56 credits of I year) from the examinations,
  - a. Two regular and Two supplementary examinations of I year.
  - b. Two regular and one supplementary examinations of II Year I Semester
  - c. One regular and one supplementary examinations of II Year II Semester
  - d. One regular III year I Semester examination.
- v. A student shall earn all the 212 credits offered as indicated in the course structure.
- vi. Students who fail to earn all the 212 credits offered as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in the course and their seat shall stand cancelled.

**8. Withholding of Results:**

The result of a student shall be withheld if:

- i. He has not cleared any dues to the Institution / Hostel;
- ii. A case of disciplinary action against him is pending disposal;

**9. Course pattern:**

- i. The entire course of study is of four academic years. The first year shall be on yearly pattern and the second, third and fourth years 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.

**10. Award of Class:**

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

First Class with Distinction	70% and above	From the aggregate marks secured for 212 Credits.
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

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

**11. Minimum Instruction Days:**

The minimum instruction for each semester / I year shall be 90/180 working days excluding examination days.

12. There shall be no branch transfers after the completion of admission process.
13. There shall be no place transfer within the Constituent Colleges of Jawaharlal Nehru Technological University for B.Tech. Regular / FDH / CCC and P.G. Programmes.

**General:**

14. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
15. The academic regulation should be read as a whole for the purpose of any interpretation.
16. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
17. The University 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 University.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**Academic Regulations for  
B.Tech. (Lateral Entry Scheme)**

(Effective for the students getting admitted into II year from the Academic Year 2003-2004 and onwards)

1. The Students have to acquire 156 credits from II to IV year of B.Tech. Programme (Regular) for the award of the degree.
2. Students, who fail to fulfill the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.
3. The same attendance regulations are to be adopted as that of B.Tech. (Regular).
4. Promotion Rule:  
  
A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of 44 credits from the examinations following
  - a. Two regular and one supplementary examinations of II Year I Semester
  - b. One regular and one supplementary examinations of II Year II Semester
  - c. One regular III year I Semester examination
5. Award of Class:

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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**(COMPUTER SCIENCE & ENGINEERING)  
I Year B.Tech**

**COURSE STRUCTURE**

SUBJECT CODE	SUBJECT	T	P	C
CS1021	English	3	-	6
CS1022	Mathematics-I	3+1*	-	6
CS1023	Solid State Physics	2+1*	-	4
CS1024	Information Technology & Numerical Methods	3	-	6
CS1025	C & Data Structures	3	-	6
CS1026	Network Theory	3	-	6
CS1027	Electronics Devices and Circuits	3	-	6
CS1028	Engineering Drawing and Practice	-	3	4
CS1029	Computer Programming Lab	-	6	8
CS1030	Electronics Devices and Circuits Lab	-	3	4
				20+2* 12 56

\* Tutorial

First Class with Distinction	70% and above	From the aggregate marks secured for 156 Credits. (i.e II year to IV year)
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%	

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

6. All other regulations as applicable for B. Tech. Four-year degree course (Regular) will hold good for B. Tech. (LES)

2002 – 2003

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**(COMPUTER SCIENCE AND ENGINEERING)**  
II Year B.Tech I Semester

**COURSE STRUCTURE**

SUBJECT CODE	SUBJECT	T	P	C
CS2121	Mathematics – II	4	-	4
CS2122	Discrete Structures and Graph Theory	✓ 4	-	4
CS2123	Object Oriented Programming	✓ 4	-	4
CS2124	Linear and Digital IC Applications	✓ 4	-	4
CS2125	Switching Theory and Logic Design	4	-	4
CS2126	Design and Analysis of Algorithms	4	-	4
✓ CS2127	OOPS Lab through JAVA	-	3	2
CS2128	IC Applications Lab	-	3	2
		24	6	28

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HYDERABAD**

**(COMPUTER SCIENCE AND ENGINEERING)**  
II Year B.Tech II Semester

**COURSE STRUCTURE**

SUBJECT CODE	SUBJECT	T	P	C
CS2221	Probability & Statistics	✓ 4	-	4
CS2222	Electrical Technology	4	-	4
CS2223	Computer Organization	✓ 4	-	4
CS2224	Managerial Economics and Financial Analysis	4	-	4
CS2225	Operating Systems and Systems Programming	✓ 4	-	4
CS2226	Database Management Systems	✓ 4	-	4
CS2227	Operating Systems and Systems Programming Lab	✓ 3	-	2
CS2228	Database Management Systems Lab	✓ 3	-	2
		24	6	28

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**(COMPUTER SCIENCE AND ENGINEERING)**

III Year B.Tech I Semester

**COURSE STRUCTURE**

SUBJECT CODE	SUBJECT	T	P	C
CS3121	Interfacing through Microprocessors	4	-	4
CS3122	Artificial Intelligence	4	-	4
CS3123	Data Communications	4	-	4
CS3124	Theory of Computation	4	-	4
CS3125	Principles of Programming Languages	4	-	4
CS3126	Object Oriented Analysis and Design through UML	4	-	4
CS3127	Interfacing through Microprocessors Lab	-	3	2
CS3128	UML Lab	-	3	2
		24	6	28

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**(COMPUTER SCIENCE AND ENGINEERING)**

III Year B.Tech I Semester

**COURSE STRUCTURE**

SUBJECT CODE	SUBJECT	T	P	C
CS3221	Management Science	4	-	4
CS3222	Computer Graphics	4	-	4
CS3223	Computer Networks	4	-	4
CS3224	Advanced Computer Architecture	4	-	4
CS3225	Language Processors	4	-	4
CS3226	Advanced Unix Programming	4	-	4
CS3227	Language Processors Lab	-	3	2
CS3228	Advanced Unix Programming Lab	-	3	2
		24	6	28

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HYDERABAD**

**(COMPUTER SCIENCE AND ENGINEERING)**

IV Year B.Tech I Semester

**COURSE STRUCTURE**

SUBJECT CODE	SUBJECT	T	P	C
CS4121	Software Engineering	4	-	4
CS4122	Distributed Systems	4	-	4
CS4123	Multimedia and Web Design	4	-	4
CS4124	Network Security and Cryptography	4	-	4
<b>Elective-I:</b>		4	-	4
CS4125	VLSI Systems Design			
CS4126	Mathematical Modeling and Simulation			
CS4127	Fault Tolerant Systems			
<b>Elective-II:</b>		4	-	4
CS4128	Data Mining and Data Warehousing			
CS4129	Human Computer Interaction			
CS4130	Digital Speech & Image Processing			
CS4131	Multimedia and Web Design Lab	-	3	2
CS4132	Computer Network Lab	-	3	2
		24	6	28

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**(COMPUTER SCIENCE AND ENGINEERING)**

IV Year B.Tech II Semester

**COURSE STRUCTURE**

SUBJECT CODE	SUBJECT	T	P	C
<b>Elective-III:</b>		4	-	4
CS4221	Embedded Systems			
CS4222	Software Project Management			
CS4223	Natural Language Processing			
CS4224	Parallel Programming			
<b>Elective-IV:</b>		4	-	4
CS4225	Cellular and Mobile Communications			
CS4226	Robotics			
CS4227	Decision Support Systems			
CS4228	Neural Networks			
CS4229	Project Work	-	-	8
		8	-	16

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

I Year B.Tech

3-0-6 CS1021

**ENGLISH  
(Common for all branches)**

The following text books of English are prescribed for I B.Tech class of all branches in the Colleges of Engineering and Technology affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, Hyderabad. The exercises given are expected to be covered by the teacher in the classroom, the objective of the course being the development of linguistic skills of the learners.

1. A textbook of English for Engineers and Technologists, OL.
2. Masterminds, OL.

**UNIT I:**

1. Energy, Unit 3: Alternative Sources (from A textbook of English for Engineers and Technologists, OL).
2. Jagadish Chandra Bose, (a profile from The Trail Blazers in Masterminds, OL).

**UNIT II:**

1. Computers, Unit 2: New Frontiers (from A textbook of English for Engineers and Technologists, OL).
2. Chandrasekhara Venkata Raman (a profile from the World of Figures and Physics in Masterminds, OL).

**UNIT III:**

1. Technology, Unit 3: Evaluating Technology (from A Text book of English for Engineers and Technologists, OL).
2. S. S. Bhatnagar (a profile from the Institution Builders in Masterminds, OL).

**UNIT IV:**

1. Environment, Unit 1: Pollution (from A Text book of English for Engineers and Technologists, OL).
2. Homi Jehangir Bhabha (a profile from the New Age in Masterminds, OL).

**UNIT V:**

1. Industry, Unit 2: Safety and Training (from A Text book of English for Engineers and Technologists, OL).

2. Salim Ali (a profile from The Living World in Masterminds, OL).

**UNIT VI:**

Common Errors, Sentence Completion, Synonyms and Antonyms, Analogy, Report Writing, Comprehension, General Essay, Situational Dialogues

**Note:**

The establishment of an English Language laboratory in each Affiliated College of Engineering and Technology is recommended with effect from the Academic year 2002-03 for the following reasons:

1. To expose the students to TOEFL and GRE model of training and practice.
2. To help the students learn correct pronunciation, accent and intonation.
3. To enable the students to improve and strengthen their communicative skills.
4. To expose the students to different variations in English expression.

It is also recommended that the English Language Laboratory training and practice is treated as a non-examination item of the curriculum.

**Books Recommended:**

1. Strengthen your writing, by V. R. Narayana Swami (OL).
2. Success with Grammar and Composition, by K. R. Narayanaswamy (OL).
3. Examine your English, by Margaret Maison (OL).
4. English for Professional Students, by S. S. Prabhakara Rao.
5. TOEFL (ARCO & BARRONS, USA) & CLIFFS TOEFL.
6. GRE (ARCO & BARRONS, USA) & CLIFFS GRE.
7. Communication skills for Technical Students by T. M. Farhathulla (OL).
8. Strategies for Engineering Communication by Susan Stevenson & Steve Whitmore (John Wiley & Sons).
9. Basic Communication skills for technology, 2 nd edition by Andrea J. Rutherford, (Pearson Education Asia).

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

2002 – 2003

**I Year B.Tech****3-0-6 CS1022**

**MATHEMATICS – I  
(Common to all Branches)**

**UNIT – I:**

Sequences – Series – Convergence and divergence – Ratio test – Comparison test – Integral test – Cauchy's root test – Raabe's test – Absolute and conditional convergence.

Rolle's theorem – Lagrange's Mean Value theorem – Cauchy's Mean value Theorem – Generalized Mean Value theorem (Taylor's Theorem)

**UNIT – II:**

Functions of several variables – limit and continuity – partial differentiation – Chain rule – Total derivative – Euler's theorem, Jacobian – Functional dependence. Maxima and Minima of functions of two variables with and without constraints, Radius, Centre and Circle of Curvature – Evolutes and Envelopes.

**UNIT – III:**

Curve tracing – Cartesian, polar and Parametric curves. Applications of integration to lengths, volumes and surface areas in Cartesian and Polar coordinates.

**UNIT – IV:**

Differential equations of first order and first degree – formation. Exact, linear and Bernoulli.

Applications to Newton's Law of cooling, Law of natural growth and decay, Orthogonal trajectories, Non-homogeneous linear differential equations of the second and higher order with constant coefficients with RHS term of the type  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , polynomial in  $x$ ,  $e^{ax} V(x)$ ,  $xV(x)$ , method of variation of parameters.

**UNIT – V :**

Laplace transform of standard functions – Inverse transform – Linearity – first shifting.

Theorem. Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Differentiation and integration of transforms –

Multiple integrals : Double and triple integrals – change of variables – Change of order of integration.

**UNIT – VI:**

Vector Differential Calculus :

Gradient, Divergence, Curl and their related properties of sums, Products, Laplacian and second order operators.

Vector integral Calculus : Vector integration – Line integral – work done – Potential function – area, surface and volume integrals. Green's theorem, Stoke's and Gauss'

Divergence Theorem. Verification of Green's, Stoke's and Gauss' Theorems. Curvilinear Coordinates – Cylindrical, Spherical Coordinates – Expressions of Grad, div, curl in Spherical, Cylindrical and Curvilinear Coordinates.

**TEXT BOOKS :**

1. A Text Book of Engineering Mathematics Volume – I, 2002  
T.K.V. Iyengar, B. Krishna Gandhi, and others, S. Chand and Company
2. Engineering Mathematics  
B.V. Ramana, Tata McGraw\_Hill 2002
3. Engineering Mathematics – I  
C. Sanakraiah, Vijaya Publications-2002
4. Engineering Mathematics – I - 2002  
P. Nageswara Rao, Y. Narsimhulu, Prabhakara Rao

**REFERENCES :**

1. Engineering Mathematics  
S.K.V.S. Sri Rama Chary, M. Bhujanga Rao, Shankar, B.S. Publications 2000
2. Advanced Engineering Mathematics (Eighth edition)  
Erwin Kreyszig , John Wiley & Sons (ASIA) Pvt . Ltd. 2001
3. Advanced Engineering Mathematics (Second edition)  
Michael D. Green Berg, Prentice Hall, Upper saddle River, New Jersey-1998
4. Sarveswara Rao Koneru  
Engineering Mathematics Orient Longman Pvt. Ltd. 2002
5. Engineering Mathematics – I  
N.P. Bali, Laxmi Publications (P) Ltd., New Delhi.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD.**

I Year B.Tech

2-0-4 CS1023

**SOLID STATE PHYSICS**

(Common for EEE, ECE, EIE, E.Cont.E, ICE, CSE, CSIT, CSSE, ETM, ECM, BME)

**UNIT – I (A):**

Bonding in solids – Cohesive energy – calculation of cohesive energy of ionic solids – application to Sodium Chloride crystal.

**UNIT – I (B):**

Space lattice – crystal structure – unit cell – lattice parameter – crystal systems – Bravais lattices – stacking sequences, metallic crystals – simple cubic, F.C.C. and B.C.C structures- Structures of Diamond, ZnS, NaCl and CsCl systems.

**UNIT – II (A):**

Directions and planes in crystals – Miller Indices- distances of separation between successive hkl planes. Imperfections in crystals – point defects – Frenkel and Schottky defects – Energy of formation of a vacancy – Number of vacancies at any given temperature.

**UNIT – II (B):**

Line defects – Edge and Screw dislocations – Burger's vector. Diffraction of X-rays by crystal planes – Bragg's law – Laue photograph – Powder method.

**UNIT – III (A): PRINCIPLES OF QUANTUM MECHANICS**

Waves and Particles – de Broglie hypothesis - G.P Thompson's experiment – Davisson and Germer's experiment – Schroedinger's wave equation (Time independent) – Physical significance of the wave function. Particle in potential box.

**UNIT – III (B): ELECTRON THEORY OF METALS**

Classical free electron theory – Mean free path, relaxation time and drift velocity – Fermi-Dirac distribution (non-mathematical treatment) – Quantum free electron theory of conduction scattering – Sources of electrical resistance – Kronig-Penny model (non- mathematical treatment) – Origin of energy band structure in solids – Concept of effective mass.

**UNIT – IV (A): DIELECTRIC PROPERTIES**

Introduction – Electronic, Ionic and Orientation polarization – Internal field – Clausius Mosotti equation – Ferro and Plezo electricity (non-mathematical treatment) – Frequency dependence of Dielectric Constant (non-mathematical treatment) – Important requirements of Insulators.

**UNIT – IV (B): MAGNETIC PROPERTIES**

Permeability – Magnetization – Origin of magnetic moment – Bohr magneton - Electron spin – Classification of magnetic materials – Domain theory of Ferro Magnetism – Hysteresis curve – Ferri and Anti-ferro magnetic substances – Ferrites and their applications – Requirements of magnetic materials for different purposes.

**UNIT – V (A): SEMICONDUCTORS**

Electrical conductivity of semiconductors – Intrinsic semiconductors – carrier concentration – Extrinsic semiconductors - carrier concentration – Minority carrier lifetime – drift and diffusion – Einstein's Equation – Equation of continuity – Hall effect.

**UNIT – V (B): SUPERCONDUCTIVITY**

General features – Meissner effect – Penetration depth – Type I and Type II superconductors – Flux quantization – Josephson Effect – BCS theory - Applications of superconductors.

**UNIT – VI (A): LASERS**

Spontaneous and Stimulated Emission – Einstein's Coefficients – Condition for Population inversion – Ruby Laser – He-Ne Laser – Semiconductor Laser – Applications of Lasers.

**UNIT – VI (B): FIBRE OPTICS**

Principle of Optical fibre – Step-index fibre – graded-index fibre – numerical aperture – Acceptance angle – Transmission signal in Step-index and graded-index fibre – Optical fibres in communication and sensing applications.

**TEXT BOOK:**

1. Solid State Physics – by S.O. Pillai (New Age International).

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

I Year B.Tech

3-0-6 CS1024

**INFORMATION TECHNOLOGY & NUMERICAL METHODS**

**UNIT I:**

Parts of a computer: Processor, memory, I/O devices, storage devices, operating system, application software

Types of computer systems: Supercomputer, Mainframe computer, Minicomputer, workstations, Microcomputers, Personal computers, desktop handheld computers.

Input devices: Keyboard, mouse, hand devices optical devices, audio visual devices.

Output devices: monitor, projectors, sound devices, printers, storage devices, files (Lessons 1,2,3,4,5,6,9 and 10 of text book1).

**UNIT II:**

Data Processing: Data representation, data processing method, data processing speed, processor power, Intel, AMD, Cyrix, Motorola, RISC processors

Operating system: User interface, program running, file management, hardware management , PC Operating Systems, Dos, Unix Windows, Windows NT

Program development: hardware/software interaction, problem to a program, structured and object oriented approaches, Programming languages, machine and high-level languages

(Lessons 7,8,11,12,15, 27 and 28 of text book1)

**UNIT III:**

Database management: Databases, the DBMS, working with a database and enterprise software. Data communication and Networking: Use of networks, network structures, network topologies, network media, telephone lines, modems, digital telephones, Internet, working of Internet, Internet features, Internet applications, Accessing the Internet, connecting PC to Internet, connecting to WWW.

(Lessons 16,17,18,19 and 20 of text book1)

**UNIT IV: ( to be taught online through PC)**

Microsoft windows ME and tools: Office 2000, Word 2000, Excel 2000, Powerpoint 2000, Access 2000, Outlook 2000, Frontpage 2000.

(Chapters 4 to 25 of text book 2).

**UNIT – V**

**Numerical Methods - I**

Iterative methods, bisection method, Newton Raphson method, successive approximation method, Gauss Jordan and Gauss Siedel methods; Interpolation, Lagrange interpolation forward difference, backward difference and central difference interpolation methods.

**UNIT – VI**

**Numerical Methods - II**

Numerical Integration by Trapezoidal and Simpson's rules, algorithms, numerical solution to differential equations, Euler method, Runge kutta method, Milne predictor corrector method, algorithms; Comparison of Runge kutta method and predictor corrector method; Regression techniques

**Text Book(s):**

1. "Introduction to Computers," Peter Norton, Tata McGraw-Hill, 4<sup>th</sup> Edition, 2001, ISBN: 0- 07-044743-8.
2. "Introduction to Computers with MS-Office 2000," Alexis Leon and Mathews Leon, Tata McGraw-Hill, 2001, 0-07-043445-X.
3. Computer oriented Numerical Methods, V. Rajaraman
4. Numerical Methods for Scientific and Engineering Computation, M. K. Jain, S. R. K. Iyengar, R. K. Jain, New Age International (P) Ltd.

**References:**

1. Using information technology – a practical introduction to computers and communication, Williams, Sawyer and Hutchins, Tata McGraw Hill, 2000
2. Computers and common sense, Shelly and Hunt,, Prentice Hall of India
3. Fundamentals of Information Technology, Alexis Leon, Mathews Leon, Leon Press and Vikas Publishing House.
4. "Using Information Technology: A Practical Introduction to Computers & communications," Brian Williams, Stacey Sawyer, and Sarah Hutchinson, Tata McGraw-Hill, 3rd Edition, 2001, ISBN: 0-07-043562-6.
5. "Upgrading and Repairing PCs", Scott Mueller, Pearson Education Asia, 13th Edition, 2002, ISBN: 81-7808-552-6.
6. "Trouble Shooting, Maintaining & Repairing PCs". Stephen J. Bigelow, Tata McGraw-Hill Publishing Company, 5th Edition, 2001, ISBN: 0-07-047367-6.
7. "Introduction to Information Technology," Efraim Turban, R. Kelly Rainer, Jr., Richard Potter, John Wiley & Sons, 2000, ISBN: 9971-51-321-8.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

I Year B.Tech

3-0-6 CS1025

**C AND DATA STRUCTURES**

**UNIT – I**

Algorithm, flowchart, program development steps, basic structures of C language, C tokens, data types, declaration of variables, assigning values, arithmetic, relational and logical operator, increment and decrement operators, control operator, bit-wise operator, expressions, evaluation, input-output operators, IF and SWITCH statement, WHILE, DO-WHILE and FOR statements, C programs covering all the above aspects.

**UNIT-II**

One dimensional & Two dimensional arrays, initialisation, string variables, declaration, reading, writing, string handle function, user-defined functions variables & storage classes, example C Programs.

**UNIT-III**

Structure definition, initialising, assigning values, passing of structures as arguments, unions, declaring & initialising of pointers, pointer based expressions, arrays, strings, functions and structures, C Program examples, file management in C, opening & Closing, I-O operations on files.

**UNIT-IV**

Stacks, representing stacks in C, Infix, Postfix & Prefix programs, recursion in C, Queue & its sequential representation, circular queue, sequence.

**UNIT-V**

Single Linked List, Double linked list, Header, Circular List, applications, binary trees, representation, tree traversals, graph representation, graph traversals, spanning trees.

**UNIT - VI**

Search techniques: linear and binary search methods, sorting methods, Exchange sort, selection sort, quick sort, tree sort.

**Text Books:**

1. C & Data Structures, E. Balagurusamy, TMH 2002.
2. Data structures using C by A. S. Tanenbaum, PHI
3. Fundamentals of Data Structures, Horowitz & Sahani

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

I Year B.Tech

3-0-6 CS1026

**NETWORK THEORY**

(Common for EEE, ECE, EIE, E.Cont.E, ICE, CSE, CSIT, CSSE, ETM, ECM, BME)

**UNIT – I:**

Circuit concept – RLC parameters – Voltage and Current sources – Source transformation – Voltage–Current relationship for Passive elements – Kirchhoff's laws – Network Reduction Techniques – Series, Parallel, Series-Parallel, Star-to-delta or delta-to-star transformations.

Magnetic Circuits – Faraday's Laws of electromagnetic induction – Concept of self and mutual inductances – dot convention – coefficient of coupling – Composite Magnetic Circuits – Analysis of Series and Parallel Magnetic Circuits.

**UNIT – II:**

RMS and Average values and Form factor of different periodic waveforms, Steady state analysis of R, L and C (in series, parallel and series-parallel combinations) with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase and phase difference – Concept of Power factor, Real and Reactive powers – j-notation, Complex and polar forms of representation, Complex power – Locus diagrams. Series R-L, R-C, R-L-C and parallel combinations with variation of various parameters – Resonance – Series, Parallel Circuits, Concept of Bandwidth and Q-factor.

**UNIT – III:**

Three phase circuits: Phase sequence – Star and Delta connection – Relation between line and phase voltages and currents in Balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Measurement of 3 phase power, active power and reactive power.

Network topology : Definitions – Graph – Tree, Basic Cutset and Basic Tieset matrices for planar network – Loop and nodal methods of analysis of networks with dependent and independent voltage and current sources. Duality and Dual networks.

**UNIT – IV:**

Network theorems (without proof): Tellegen's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millman's and Compensation theorems for dc and ac excitations.

**UNIT – V:**

Transient response of RL, RC and RLC circuits (series and parallel combinations) for dc and Sinusoidal excitations – Initial conditions – Classical method and Laplace transform Methods of solutions – Response of RL, RC, RLC for step, ramp, pulse and impulse excitations using Laplace Transform Methods.

**UNIT – VI:**

Two port network parameters – Z, Y, (ABCD) Transmission and Hybrid Parameters for Resistive Networks – concept of Transformed Network – 2-port network parameters using transformed variables.

Filters – Low pass, High pass and Band pass filters – Constant-k and m-derived filters and composite filter design.

**TEXT BOOKS:**

1. Engineering Circuit Analysis – by William Hayt and Jack E. Kemmerly, McGraw Hill, 5/e.
2. Electric Circuits – by J. Edminister and M. Nahvi, - Schaum's outlines, TMH, 1999.
3. Network Theory – by N. Srinivasulu, Hi-Tech Pub.

**REFERENCES:**

1. Network theory – Sudhakar and Shymmohan , TMH publications.
2. Network Analysis: - C.K. Mithal, Khanna Publishers.
3. Network Theory: - N.C. Jagan & C.Lakshminarayana, B.S Publications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

I Year B.Tech

3-0-6 CS1027

**ELECTRONIC DEVICES & CIRCUITS**

(Common for EEE, ECE, EIE, E.Cont.E, ICE, CSE, CSIT, CSSE, ETM, ECM, BME)

.1

**UNIT – I: ELECTRON DYNAMICS AND CRO**

Motion of charged particles in electric and magnetic fields. Simple problems involving electric and magnetic fields only. Electrostatic and magnetic focusing. Principles of CRT, deflection sensitivity (Electrostatic and magnetic deflection). Applications of CRO: Voltage, Current and Frequency Measurements.

**UNIT – II: SEMICONDUCTOR DIODES AND RECTIFIERS**

Construction, Principle of operation, V-I characteristics, symbol, equivalent circuit, parameter calculation, limitations and specifications of – pn junction diode, Zener diode, Varactor diode, Tunnel diode and photo diode. Diffusion and transition capacitances of pn junction diode. Hall Effect. Diode applications : Rectifiers – Half wave, Full wave and Bridge Rectifiers, Filters – L, C, L-Section and p -section filters.

**UNIT – III: TRANSISTOR CHARACTERISTICS**

Construction, principle of operation, V-I characteristics, symbol, equivalent circuit, parameter calculations, applications, limitations and specifications of – BJT, FET, UJT and MOSFETs (different configurations of transistors are to be considered).

SCR, DIAC, TRIACs. Optoelectronic devices.

**UNIT – IV: AMPLIFIERS**

Biasing, DC equivalent model, criteria for fixing operating point and methods of Bias stabilization, Thermal run away and thermal stability. Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of BJT and FET. RC coupled amplifier – frequency response. Biasing of FET, MOSFET. FET amplifier – frequency response, FET Small signal model.

**UNIT – V: FEEDBACK AMPLIFIERS**

Concepts of feedback. Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Simple problems.

**UNIT – VI: OSCILLATORS**

Condition for oscillations, RC and LC type oscillators, Crystal oscillators, Frequency and amplitude stability of oscillators, Generalized analysis of LC oscillators, Quartz (Hartley, Colpitts), RC-phase shift and Wien-bridge oscillators.

**TEXT BOOKS:**

1. Electronic Devices and Circuits – by Millman and Halkias, Tata McGraw Hill.
2. Electronic Devices and Circuits – by R.L. Boylestad and Louis Nashelsky, Pearson Ed. Asia, PHI.
3. Electronic Devices and Circuits – by K. Lal Kishore, B.S. Publ.

**REFERENCES:**

1. Microelectronics – by Millman and Grabel, Tata McGraw Hill.
2. Electronic Devices and Circuits – by Bogart, Universal Bookstall, New Delhi.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD****ENGINEERING DRAWING PRACTICE**

(Common for EEE, ECE, EIE, E.Cont.E, ICE, CSE, CSIT, CSSE, ETM, ECM, BME)

**UNIT – I:**

Introduction to Engineering Graphics – Construction of Ellipse, Parabola and Hyperbola, Cycloidal Curves.

**UNIT – II:**

Orthographic Projections of Points, Lines and Planes – Axis inclined to one plane and inclined to both the planes.

**UNIT – III:**

Orthographic Projections of Solids: Cylinder, Cone, Prism, Pyramid and Sphere in simple positions and Axis inclined to both the Planes.

**UNIT – IV:**

Development of Surfaces: Prisms, Cylinder, Pyramid and Cone.

**UNIT – V:**

Isometric Projections of Lines, Planes and Simple Solids.

**UNIT – VI:**

Conversion of Orthographic Views into Isometric Views and Vice-Versa.

**TEXT BOOKS:**

1. Engineering Graphics – by K.L. Narayana & P. Kannayya, SciTech Publishers.
2. Engineering Drawing – by N.D. Bhatt, Charotar Publishers.
3. Engineering Drawing and Graphics – by Venugopal, New Age International Limited.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

1 Year B.Tech

0-6-8 CS1029

**COMPUTER PROGRAMMING LAB**

1. Write a C program that evaluates the following algebraic expressions after reading necessary values from the user:
  - a)  $ax+b/ax-b$
  - b)  $2.5 \log x + \cos 32^0 + |x^2 - y^2| + \sqrt{2xy}$
  - c)  $1/av^2? e- (x-m/v^2s)^2$
2. Write a C program for the following
  - a) Printing three given integers in ascending order
  - b) Sum of  $1 + 2 + 3 + \dots + n$
  - c)  $1 + x^2/2! + x^4/4! + \dots$  upto ten terms
  - d)  $x + x^3/3! + x^5/5! + \dots$  upto 7<sup>th</sup> digit accuracy
  - e) Read x and compute Y=1 for  $x > 0$   
 $Y=0$  for  $x = 0$   
 $Y= -1$  for  $x < 0$
3. Write C program using FOR statement to find the following from a given set of 20 integers.
  - i) Total number of even integers. ii) Total number of odd integers.
  - iii) Sum of all even integers. iv) Sum of all odd integers.
4. Write a C program to obtain the product of two matrices A of size (3X3) and B of size (3X2). The resultant matrix C is to be printed out along with A and B. Assume suitable values for A & B.
5. Using switch-case statement, write a C program that takes two operands and one operator from the user, performs the operation and then prints the answer. (consider operators +, -, \*, / and %).
6. Write C procedures to add, subtract, multiply and divide two complex numbers  $(x+iy)$  and  $(a+ib)$ . Also write the main program that uses these procedures.
7. The total distance travelled by vehicle in 't' seconds is given by distance  $= ut + \frac{1}{2}at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>). Write C program to find the distance traveled 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'.

8. A cloth show room has announced the following seasonal discounts on purchase of items.

PURCHASE	Discount (Percentage)	
AMOUNT	Mill Cloth	Handloom items
1-100	—	5.0
101-200	5.0	7.5
201-300	7.5	10.0
Above 300	10.0	15.0

Write a C program using switch and If statements to complete the net amount to be paid by a customer.

9. Given a number, write C program using while loop to reverse the digits of the number. Example 1234 to be written as 4321.
10. The Fibonacci sequence of numbers is 1,1,2,3,5,8... based on the recurrence relation

$$f(n) = f(n-1) + f(n-2) \text{ for } n > 2.$$

Write C program using do-while to calculate and print the first m fibonacci numbers.

11. Write C programs to print the following outputs using for loop.

1	1
2 2	2 2
3 3 3	3 3 3
4 4 4 4	4 4 4 4
5 5 5 5 5	5 5 5 5 5

12. Write a C program to extract a portion of a character string and print the extracted string. Assume that m characters are extracted starting with the nth character.

13. A Maruthi Car dealer maintains a record of sales of various vehicles in the following form:

Vehicle type	Month of Sales	Price (Rs.)
Maruthi – 800	02/87	75,000
Maruthi – DX	07/87	95,000
Gypsy	04/87	1,10,000
Maruthi Van	08/88	85,000

Write a C program to read this data into a table of strings and output the details of a particular vehicle sold during a specified period. The program should request the user to input the vehicle type and the period (Starting month & ending month).

14. Write a function that will scan a character string passed as an argument and convert all lower case characters into their upper case equivalents.
15. Implement the following data structures using Arrays
- i) Stacks      ii) Linear Queues iii) Circular queues iv) Dequeue.
16. Implement polynomial addition and multiplication with linked list sparse matrix.
17. Implement binary search tree using linked list and perform the following operations.
- i) Insertion    ii) Deletion      iii) Inorder Traversal
  - iv) Preorder Traversal      v) Post Order Traversal.
18. Singly linked list and doubly linked lists
- i) Insertion    ii) Deletion      iii) Lookup
19. i) Implement stack using singly linked list.  
ii) Implement queue using singly linked list.

20. Implement the following sorting techniques.
- i) Bubble sort      ii) Insertion Sort    iii) Quick Sort    iv) Heap Sort.
21. Implement the following searching method.
- i) Sequential Search    ii) Binary Search    iii) Fibonacci
22. i) Conversion of Infix expression to Postfix notation.  
ii) Simple expression evaluator, that can handle +, -, / and \*.
23. Implement the algorithms for the following iterative methods using C to find one root of the equation
- $$x_1 + 10x_2 + 4x_3 = 6$$
- $$2x_1 - 4x_2 + 10x_3 = -15.$$
25. Write Computer programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.
26. Implement in 'C' the linear regression and polynomial regression algorithms.
27. Implement Trapezoidal and Simpson methods.
28. Practice of exercises (in text book 2 of theory) related to:
- a) Word 2000 Chapter 7, 8, 9.      b) Excel 2000 Chapter 12, 13.
  - c) Powerpoint- 2000 Chapter 15, 16. d) Access 2000 Chapter 18,19.
  - e) Outlook 2000 Chapter 21,22,23. f) FrontPage 2000 Chapter 25

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

I Year B.Tech

0-3-4 CS1030

**ELECTRONIC DEVICES & CIRCUITS LAB**

(Common for EEE, ECE, EIE, E.Cont.E, ICE, CSE, CSIT, CSSE, ETM, ECM, BME)

1. PN Junction diode characteristics  
A. Forward bias    B. Reverse bias.
2. Zener diode characteristics
3. Transistor CB characteristics (Input and Output)
4. Transistor CE characteristics (Input and Output)
5. Transistor CC characteristics (Input and Output)
6. Rectifier without filters (Full wave & Half wave)
7. Rectifier with filters (Full wave & Half wave)
8. FET characteristics
9. UJT characteristics
10. Study of CRO
11. Measurement of h parameters of transistor in CB, CE, CC configurations
12. CE amplifier
13. CC amplifier (emitter follower)
14. Single stage R-C coupled Amplifier.
15. FET amplifier (Common Source)
16. FET amplifier (Common Drain)
17. Wien Bridge Oscillator
18. RC Phase Shift Oscillator
19. Feed back amplifier (Current Series).
20. Feed back amplifier (Voltage Series).
21. Colpitts Oscillator
22. Hartley Oscillator
23. SCR characteristics.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

II Year B.Tech I Semester

4-0-4 CS2121

**MATHEMATICS – II**

(Common for all Branches)

**UNIT – I**

Matrices – brief review – Inverse of a matrix by adjoint , elementary row transformations – Rank - Normal form – echelon form. Augmented matrix – Consistency – Solution of system of simultaneous linear homogeneous and non-homogeneous equations.

**UNIT – II**

Eigen values, eigen vectors – properties – Cayley-Hamilton Theorem (Inverse and powers of a matrix by Cayley-Hamilton theorem). Quadratic forms – positive, negative definite – Diagonalization of matrix. Calculation of powers of matrix – Modal and spectral matrices. Real matrices – Symmetric, skew-symmetric, orthogonal. Linear Transformation – Orthogonal Transformation. Quadratic forms – Reduction of quadratic form to canonical form – index – signature.

Complex matrices : Hermitian, Skew-Hermitian and Unitary – Eigen values and eigen vectors of complex matrices and their properties.

**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 :**

Formation of Partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations. Method of separation of variables – Classification of second order linear Partial Differential Equations, solutions of one dimensional heat equation, wave equation and two-dimensional Laplace's equation under initial and boundary conditions.

**UNIT – V**

Fourier integral theorem – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – properties – Inverse transforms – Finite Fourier transforms. Solution of one dimensional wave, heat equations and two dimensional Laplace's equation by Fourier transforms.  
z-transform – Inverse z-transform – properties – Damping rule – shifting rule – Initial and final value theorems.

Convolution theorem – Solution of difference equations by z-transforms.

**TEXT BOOKS :**

1. A Text Book of Engineering Mathematics Volume – II - 2002  
T.K.V. Iyengar, B. Krishna Gandhi and others, S. Chand and Company
2. Engineering Mathematics  
B.V. Ramana, Tata McGraw-Hill -2002
3. Engineering Mathematics – II - 2002  
C. Sankaraiah, Vijaya Publications
4. Engineering Mathematics – II - 2002  
P. Nageswara Rao, Y. Narsimulu, Prabhakar Rao

**REFERENCES :**

1. Engineering Mathematics  
S.K.V.S. Sri Rama Chary, N. Bhujanga Rao, P. Bhaskara Rao, B.S. Publications 2000
2. Advanced Engineering Mathematics (Eighth edition)  
Erwin Kreyszig, John Wiley & Sons (ASIA) Pvt. Ltd. - 2001
3. Advanced Engineering Mathematics (Second edition)  
Michael D. Greenberg, Prentice Hall, Upper saddle River, New Jersey-1998
4. Sarveswara Rao Koneru  
Engineering Mathematics Orient Longman (Pvt.) Ltd. 2002
5. Engineering Mathematics - II  
N.P. Bali, Laxmi Publications (P) Ltd., New Delhi.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**
**II Year B.Tech I Semester**
**4-0-4 CS2122**
**DISCRETE STRUCTURES AND GRAPH THEORY**
**UNIT-I****Mathematical Logic:**

Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, predicates, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theory Proving.

**UNIT II****Set Theory**

Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hasse diagram, Functions, Inverse functions, Composition of functions, Recursive functions, Lattice and its properties.

**UNIT III****Graph Theory I:**

(Elementary treatment only) Definition, Representation, path Matrix Warshalls Algorithm, MINIMA Algorithm, Isomorphism, sub graphs, connected components, cyclic graph, Bipartite graph, Planar graph, Euler's formula, Euler circuit, De Bruijn sequence, Hamiltonian Graph, Chromatic number, cutset, tie etc.

**UNIT IV****Graph Theory II:**

Trees, Spanning tree of a Graph, Breadth – First & Depth – First Spanning trees, Binary Tree, Conversion of a tree, to binary tree. Tree traversals, Representation of Expressions by Binary tree, Forest, Binary search trees.

**UNIT V:****Combinatorics & Recurrence Relations:**

Disjunctive & Sequential counting, Combinations & Permutations, Enumeration without repetition Recurrence relation, Fibonacci relation, solving recurrence relation by substitution, solving non-linear recurrence relation by conversion to linear recurrence relation.

**TEXT BOOKS:**

1. Discrete Mathematical Structures with applications to computer science  
Tremblay J.P. & Manohar .P
2. Discrete Maths for Computer Scientists & Mathematicians (Chapter 2,5,7) Prentice Hall, 1986 J.L. Mott, A. Kandel, T.P. Baker.

**REFERENCE:**

1. Discrete Mathematical Structures, Kolman, Busby, Ross, Pearson Education IV edition.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

II Year B.Tech I Semester

4-0-4 CS2123

**OBJECT ORIENTED PROGRAMMING. (THROUGH JAVA.)****UNIT I:**

Introduction to object oriented programming concepts- java as an object oriented programming language - introduction to java applications and applets-control structures-methods-arrays. (chapters 1-7 )

**UNIT II:**

Object based and object oriented programming-creating packages –using overloaded constructors-static class variables-data abstraction and information hiding-relation between super class objects and subclass objects-composition verses inheritance-polymorphism -dynamic method binding-abstract super classes and concrete super classes-inheriting interface- use of inner classes and wrapper classes- StringTokenizer and StringBuffer classes.(chapters 8,9,10)

**UNIT III:**

Role of object oriented programming in designing GUI- Graphics and Java2D-overview of swing- event handling, adapter classes and layout managers. Advance GUI components-JPopupMenu- JDesktopPane-advance layout managers. (Chapters 11,12,13)

**UNIT IV:**

Exception handling and multithreading in object oriented programming- When exception handling should be used-java exception handling-exceptions and inheritance- multithreading in java –thread synchronization-daemon threads-Runnable interface- Files and Streams in java. ( Chapters 14,15,17)

**UNIT V:**

Network and Database handling through object oriented programming- using JDBC – processing queries- overview of servlets- multitier applications using JDBC from a Servlet- introduction to networking-establishing a simple server and a client- introduction to RMI - implementing the remote interface(chapters 18,19,20,21)

**TEXT BOOK:**

1. Java How To Program, H. M. Deitel and P. J. Deitel, Prentice Hall 3<sup>rd</sup> edition.
2. "An Introduction to Programming and object oriented Design using Java" by Jaime Nino and Fedric A Hosch, John Wiley.

**REFERENCE BOOKS:**

1. An introduction to Object Oriented Programming with Java II Edition, C Thomas Wu, TMH.
2. The complete reference JAVA 2 IV Edition, Herbert Schildt, TMH.
3. Introduction to Java Programming, Daneal/Yong, PHI
4. Beginning Java 2 , Ivon Horton ,Wrox Publishers
5. Internet and Java Programming, R.Krishnamoorthy nsd S.Prabhu, New Age International.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

II Year B.Tech I Semester

4-0-4 CS2124

**LINEAR & DIGITAL IC APPLICATIONS**

(Common for ECE, EIE, E.Cont.E, Mechatronics, CSE &amp; CSIT)

**UNIT -I****OPERATIONAL AMPLIFIERS:**

Design aspects of Monolithic Opamps, ideal characteristics, specifications offset voltages & currents, frequency compensation techniques, measurements of opamps parameters, application of Opamps, inverting, non-inverting amplifiers, integrators, function generators, logarithmic amplifiers, instrumentation amplifiers, signal conditioning circuits, multi-vibrators, square wave generator, rectifiers, peak detectors and voltage regulators.

**UNIT - II**

555 Timer, 556 function generator, IC's & their applications, terminal regulators IC 1496 (Balance modulator) IC565 phase locked loops & their typical applications, IC1496 (Balanced modulator) applications.

**UNIT-III****ACTIVE FILTERS:**

LPF, HPF, BPF, BEF, ALL Pass filters, and higher order filters and design, VCSV and IGMF configurations.

**UNIT-IV****LOGIC FAMILIES:**

DTL,TTL,ECL,IIL,MOS Logic families, parameters and their comparison, try state logic, interfacing of Logic Families, Flip-Flops.

**UNIT-V:**

Analog multiplexers, sample and hold circuits, D/A converters – resistive divider and ladder Networks, A/D converters, counters – ramp type, dual slope, integration technique, successive approximation, parallel comparison technique.

**REFERENCE BOOKS:**

1. Micro Electronics – Jacob Millman (ISE)
2. Opamps & Linear integrated circuits – Ramakanth Gayakwad (PHI)
1. Integrated Circuits – Borkar (Khanna)
2. Applications of linear integrated circuits – Clayton.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD****II Year B.Tech I Semester****4-0-4 CS2125****SWITCHING THEORY & LOGIC DESIGN****UNIT – I:****NUMBER SYSTEMS & CODES:**

Review of number systems – binary arithmetic – binary weighted and non-weighted codes – error detecting and error correcting codes.

**BOOLEAN ALGEBRA:**

Postulates and theorems; representation of switching functions – SOP & POS forms – Karnaugh Map representation – Minimisation using K-maps.

**UNIT – II:****DESIGN OF COMBINATIONAL CIRCUITS:**

Tabular minimization – design of single output and multi output functions – design using conventional AND, OR, NOT, NAND, NOR & EX – OR gates. Design using MSI & LSI devices – Digital multiplexer / selector decoder, demultiplexer – design of 4 bit adder, carry look – ahead adder, magnitude comparator – BCD converter, logic implementations using ROM, PAL & PLA.

**UNIT – III:****INTRODUCTION TO SEQUENTIAL CIRCUITS:**

Combinational versus sequential circuits, Asynchronous versus synchronous circuits - State table and state diagram – state assignment – Memory elements and their excitation functions – T flip flop, D flip flop, RS flip flop, JK flip-flops and their excitation requirements – Design of synchronous sequential circuits like Sequence Detectors and binary counters.

**UNIT – IV:****CAPABILITIES & MINIMIZATION OF SEQUENTIAL MACHINES:**

Melay and Moore machines – capabilities and limitations of finite state machine - state equivalence and machine minimization.

**UNIT – V:****ALGORITHMIC STATE MACHINES:**

ASM chart, Timing considerations, control implementation, Design with multiplexers and PLA control. Introduction to unate functions and threshold logic.

**TEXT BOOKS:**

1. Switching finite automata Theory – by Zvi Kohavi, TMH edition.
2. Digital Logic and Computer Design – by Mano, M.Morris.
3. Digital Logic Design Principles – by Normal Balbamian, Bredly John Wiley.

**REFERENCES:**

1. Introduction to switching theory and logic design – by F.J. Hill and Peterson, John Wiley Publications.
2. Digital logic - Applications & Design – by John M Yarbrough, Vikas Publications, 1997.
3. Digital Systems Design – by R.P. Jain.
4. Digital Systems : Principles and Applications – Ronald J. Tocci, Pearson Education.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

II Year B.Tech I Semester

4-0-4 CS2126

**DESIGN AND ANALYSIS OF ALGORITHMS****UNIT-I****INTRODUCTION:**

Algorithm analysis, Time complexity and space complexity, O notation Omega notation and Theta notation.

**DIVIDE AND CONQUER:**

General Method, merge sort, quick sort, strassen's matrix multiplication.

**GREEDY METHOD:**

General method, optimal storage on tapes, knapsack problem, minimum spanning tree.

**UNIT-II****SET MANIPULATION ALGORITHMS:**

Fundamental operation of sets, algorithm for UNION and FIND, introduction to optimal binary search tree, balanced tree schemes, 2-3 tree, AVL tree, dictionary, priority queue, mergeable heap, heap for priority queue.

**UNIT-III****DYNAMIC PROGRAMMING:**

Multistage graphs, optimal binary search trees, 0/1 knapsack problem, reliability design problem, traveling sales person problem.

**UNIT-IV****SEARCH AND TRAVERSAL TECHNIQUES:**

Efficient non-recursive binary tree traversal algorithms, tree traversal, breadth first search and traversal, depth first search and traversal, AND/OR graphs, game tree.

**BACK TRACKING:** General method, 8 \_queen problem, graph coloring problem.

#### UNIT-V:

##### BRANCH AND BOUND:

LC search, bounding, LC branch and bound, FIFO branch and bound.

##### ALGEBRAIC SIMPLIFICATION AND TRANSFORMATIONS:

General Method, Evaluation and interpolation, modular arithmetic.

##### TEXT BOOKS:

1. "Fundamentals of Algorithms", E. HOROWITZ and S. SAHNI, GALGOTIA.
2. "Design and Analysis of Algorithms" E. HOROWITZ and S. SAHNI Edition 1984.

##### REFERENCE BOOKS:

1. Algorithm Design ,Micheal P Goordicoh , Roberto Tamassia, John Wiel

### JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

II Year B.Tech I Semester

0-3-2 CS2127

### OOPS LAB THROUGH JAVA

**Note:** The student is advised to refer the prescribed textbook for detailed description of the exercises and hints.

1. Write a java application that reads in two integers and determines and prints if the first is a multiple of the second. (Ex 2.28 pp 74)
2. Write an applet that inputs from the user the radius of a circle as a floating point number and draws the circles diameter, circumference and area. (Ex 3.9 pp 110)
3. Write an applet that allows the user to input the four arguments required by method drawOval , then draws an oval using the four input values.(Ex 3.18 pp 111)
4. Find two largest values of the 10 numbers entered. (Numbers are not repeated) (Ex 4.17 pp 152)
5. Write an application to find all Pythagorean triples for side1, side2, and hypotenuse all no larger than 500.(Ex 5.18 pp 198)
6. Write a method that determines if a number is prime. Use this method in an applet that determines and prints all the prime numbers between 1 and 10,000. (Ex 6.26 pp 263)
7. A company pays its sales people on a commission basis. The sales people receive \$200 per week plus 9% of their gross sales for that week. Write a program that determines how many of the sales people earn salaries in each of the following ranges: 200-299 , 300-399 ,400-499, \_\_\_\_\_ 900-999, 1000 and over. (Ex 7.10 pp 306)
8. Create a class Rectangle. The class has attributes length and width each of which defaults to 1. It has methods that calculate the perimeter and the area of the rectangle. It has set and get methods for both length and width.(Ex 8.8 pp 381)
9. Develop a basic graphics package using Shape inheritance to draw rectangles, triangles circles as per user choice. (Ex 9.24 pp 452)

10. Write a pay roll system. (Ex 9.25 pp 452)
11. Write an application that inputs a line of text tokenizes the line with an object of class StringTokenizer and outputs the tokens in reverse order. (Ex 10.13 pp 507)
12. Write an application that simulates a screen saver. (Ex 11.20 pp 553)
13. Write a program that draws a rectangle when a mouse is dragged with appropriate width and length. (Ex 12.27 pp 623)
14. Build your own color system that can be used by other applets and applications. (Ex 13.13 pp 696)
15. Use inheritance to create an exception super class and various exception sub classes. Write a program to demonstrate that the catch specifying the super class catches sub class exceptions. (Ex 14.21 pp 732)
16. Write a java program to demonstrate that as a high priority thread executes, it will delay the execution of all lower priority threads. (Ex 15.19 pp 771)
16. Define and develop a complete query application for the books.mdb database. (Ex 18.2 pp 933)
18. Write cookies to allow user to select books and order them. (Ex 19.3 pp 979)
19. Implement class Temperature Server Impl which down loads weather information from National Weather Service twice a day. (Ex 20.3 pp 1001)
20. Use a socket connection to allow a client to specify a file name and have the server send the contents of a file or indicate that the file does not exist. (Ex 21.15 pp 1048).

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

II Year B.Tech I Semester

0-3-2 CS2128

**IC APPLICATIONS LAB**

(Common for ECE,EIE,E.Cont.E, Mechatronics)

(Minimum 10 experiments should be conducted)

1. Integrator and Differentiator using 741 OPAMP
2. A) Astable using 555  
B) Monostable using 555
3. Function generator using 741 OPAMP.
4. Voltage regulator using
5. Inverter transfer characteristics and study of logic gates.
6. Study of flip flops using Ics.
7. 7490 counters.
8. Half adder, full adder and subtractor
9. BCD to 7 segment decoder using 7447
10. Three terminal regulator 7805,7809,7912,565,PLL,566 VCO
11. D/A Converter
12. A/D Converter
13. Study of PLAS.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**II Year B.Tech II Semester****4-0-4 CS2221****PROBABILITY AND STATISTICS**

(Common to Computer Science, Civil and Mechanical Engineering)

Effective for the batches admitted in the year 2002 and onwards.

**UNIT – I****PROBABILITY :**

Sample space and events – probability - The axioms of probability – Some elementary theorems – conditional probability – Baye's theorem

**UNIT – II****PROBABILITY DISTRIBUTIONS:**

Random variables – Discrete and continuous – Distribution – Distribution function – Distributions – Binomial, poisson and normal distribution – related properties

**UNIT – III****SAMPLING DISTRIBUTION:**

Populations and samples – Sampling distributions of mean (known and unknown) Proportions, sums and differences.

**UNIT – IV****INFERENCES CONCERNING MEANS AND PROPORTIONS:**

Point estimation – Interval estimation – Bayesian estimation – Test of Hypothesis – Means and proportions – Hypothesis concerning one and two means-Type I and Type II errors. One tail, two-tail tests- Tests of significance - Student t- test, F-tests, -  $\lambda^2$  test, estimation of proportions .

**UNIT – V****CURVE FITTING:**

The method of least squares – inferences based on the least squares estimations – Curvilinear regression – multiple regression- Correlation for univariate and bivariate distributions.

**TEXT BOOKS :**

1. Probability and Statistics for Engineers by Irwin Miller and John E. Freund. Prentice-Hall of India Private Limited, 6<sup>th</sup> edition.
2. Engineering Mathematics – B.V. Ramana, Tata McGraw-Hill -2002

**REFERENCE BOOK :**

1. Probability and Statistics for Engineers. By Walpole and Meyer.
2. Advanced Engineering Mathematics (Eighth edition)

Erwin Kreyszig, John Wiley

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**II Year B.Tech II Semester**

**4-0-4 CS2222**

**ELECTRICAL TECHNOLOGY**

(Common for ECE, EIE, E.Cont.E, CSE, CSIT, BME)

**UNIT-I: DC MACHINES**

Principle of operation of DC Machines- EMF equation – Types of generators – Magnetization and load characteristics of DC generators – DC Motors – Types of DC Motors – Characteristics of DC motors – 3-point starters for DC shunt motor – Losses and efficiency – Swinburne's test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

**UNIT-II: TRANSFORMERS:**

Principle of operation of single phase transformer – types – Constructional features – Phasor diagram on No Load and Load – Equivalent circuit – Losses and Efficiency and Regulation – OC and SC tests – Predetermination of efficiency and regulation.

**UNIT-III: THREE PHASE INDUCTION MOTOR:**

Principle of operation of three-phase induction motors – Constructional features – Slip ring and Squirrel cage motors – Slip-Torque characteristics – Efficiency calculation – Starting methods.

**UNIT-IV:**

Synchronous generators – Constructional features – types – EMF Equation – Distribution and Coil span factors – Predetermination of regulation by Synchronous Impedance Method – OC and SC tests.

Principle of operation of synchronous motor.

**UNIT-V:**

Single Phase Induction Motors – Constructional features – Shaded pole motors – Capacitor motors, AC servomotor, AC tachometers, Synchros, Stepper Motors – Characteristics.

**TEXT BOOKS:**

1. Electrical Technology – Edward Hughes, 7<sup>th</sup> Edition – Pearson Education / PHI.
2. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ

**REFERENCES:**

1. Electrical Engineering – Del Toro, 2<sup>nd</sup> Edition, Prentice Hall of India.
2. Electrical Machines – P.S Bhimbra, Khanna Publishers

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,****HYDERABAD****II Year B.Tech II Semester****4-0-4 CS2223****COMPUTER ORGANIZATION****UNIT I**

Concept of Von Newman Machine, components in a computer, functions of various of components, bus structure, arithmetic logic unit, computer arithmetic: addition/subtraction of integers, multiplication and division of integers; floating point arithmetic operations, BCD arithmetic operations.

**UNIT II**

Concept of instruction format and instruction set of a computer, types of operands and operations; addressing modes; processor organization, register organization and stack organization; instruction cycle; basic details of Pentium processor and power PC processor, RISC and CISC instruction set.

**UNIT III**

Memory devices: Semiconductor and ferrite core memory, main memory, cache memory, associative memory organization; concept of virtual memory; memory organization and mapping; partitioning, demand paging, segmentation; magnetic disk organization, introduction to magnetic tape and CDROM.

**UNIT IV**

IO Devices: Programmed IO, interrupt driver IO, DMA, IO modules, IO addressing; IO channel, IO Processor, Dot matrix printer, ink jet printer, laser printer.

**UNIT V**

Advanced concepts: Horizontal and vertical instruction format, microprogramming, microinstruction sequencing and control; instruction pipeline; parallel processing; problems in parallel processing; data hazard, control hazard.

**Text Books:**

1. "Computer organization and architecture", Williams Stallings, PHI of India, 1998.
2. Computer organization, Carl Hamachar, Zvonko Vranesic and Safwat Zaky, McGraw Hill International Edition.
3. Computer Architecture & Organization, John P. Hayes, TMH III Edition.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**II Year B.Tech II Semester**

**4-0-4 CS2224**

**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

**UNIT I:**

**Introduction to Managerial Economics**

Managerial Economics: Definition, nature and scope – Demand analysis; Law of Demand, demand determinants, Elasticity of Demand: Definition, types, measurement and significance- Demand Forecasting methods.

**UNIT II**

**Theory of Production**

Firm and industry – Production Function – Cobb Douglas Production Function – Laws of returns – Internal and External economies of scale.

Cost Analysis: Cost concepts, fixed vs variable costs, explicit vs implicit costs, out-of-pocket costs vs imputed costs, opportunity cost, sunk costs and abandonment costs.

Break-even analysis: Concept of Break-Even point (BEP) – Break Even Chart – Determination of BEP in volume and value – Assumptions underlying and practical significance of BEP. (Simple Problems).

**UNIT III:**

**Introduction to Markets and Business Organizations**

Market Structures – Types of competition – Features, of Perfect Competition, Monopoly, Monopolistic Competition – Price-output determination. Types of Business Organization – Features, merits and demerits of Sole proprietorship, Partnership and Joint stock companies – types of companies – Public Enterprises – Types of features.

**UNIT IV:**

Introduction to Capital: Capital and its significance – types of capital – Estimation of Fixed and working capital requirements – Methods of raising capital.

Introduction to capital budgeting methods: Pay back method, Accounting Rate of Return (ARR) and Net Present Value (NPV) method (Simple Problems).

**UNIT V:**

Introduction to Financial Accounting and Financial analysis: Double Entry Book Keeping – Journal – Ledger – Trial Balance – Trading Account, Profit and Loss Account and Balance Sheet with Simple adjustments.

Ratio Analysis: Computation of liquidity ratios (current ratio and quick ratio), activity ratios (inventory turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt-equity Ratio and Interest Coverage Ratio) and Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratio and EPS). Analysis and Interpretation.

**Books for Reference:**

1. Managerial Economics, Joel Dean, PHI, 2001.
2. Financial Management Policy 12<sup>th</sup> Edition, James C. Van Horne, PHI.
3. Managerial Economics, Varshini & Maheswari, S. Chand & Co., 2000
4. Fundamentals of Business Organization and ManagementY. K. Bhushan, Sultan Chand, New Delhi.
5. Financial Accounting, Narayana Swamy, PHI 2001.
6. Managerial Economics and Financial Analysis (MEFA) for JNTU (B.Tech), TMH, New Delhi.
7. Readings in Accounting and Finance, R. K. Mishra et al.
8. R. L. Gupta, Financial Accounting Volume I, Sultan Chand, New Delhi, 2001.

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HYDERABAD**

II Year B.Tech II Semester

4-0-4 CS2225

OPERATING SYSTEMS & SYSTEMS PROGRAMMING

UNIT - 1

**Operating System Overview:** Operating System Objectives and Functions, The Evaluation of Operating Systems, Major Achievements, Characteristics of Modern Operating Systems, Windows 2000 Overview, Traditional UNIX Systems, Modern UNIX Systems.

**Process Control and Scheduling:** Process States, Process Description, Process Control, UNIX SVR4 Process Management, Uniprocessor Scheduling-Type of Scheduling, Scheduling Algorithms, Traditional UNIX Scheduling.

UNIT-II

Threads, SMP and Microkernels and Concurrency: Process and Threads, Symmetric Multiprocessing, Microkernels, Windows 2000 Thread and SMP Management, Solaris Thread and SMP Management, Linux Process and Thread Management. Principles of Concurrency, Mutual Exclusion, Software Approaches, Mutual Exclusion: Hardware support, Semaphores, Monitors, Message Passing, Readers/Writers problem.

**Deadlocks:** Principles of Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, An Integrated Deadlock strategy Dining Philosophers problem, UNIX Concurrency Mechanisms, Solaris Thread Synchronization primitives, Windows 2000 Concurrency Mechanisms.

UNIT-II

**Memory Management:** Memory Management Requirements, Memory Partitioning, Paging, Segmentation. Virtual Memory-Hardware and Control structures, Operating System software, UNIX and Solaris Memory Management, Linux Memory Management, Windows 2000 Memory Management.

**File Management: Overview, File Organisation, File Directories, File sharing, Record Blocking, Secondary Storage Management, UNIX File Management, Windows 2000 File System.**

UNIT-IV

I/O Management and Disk Scheduling: I/O Devices, Organization of the I/O Function, Operating system Design Issues, I/O Buffering, Disk Scheduling, RAID, Disk Cache, UNIX SVR4 I/O, Windows 2000 I/O.

Computer Security: Security Threats, Protection, intruders, Malicious Software, Trusted Systems, Windows 2000 Security.

**Assemblers:** Elements of Assembly language programming a simple assembly scheme, pass structure of assemblers, Design of a two pass assembler a single pass assembler for IBM PC.

UNIT-V

**MACROS and MACRO Processors:** Macro definition and call, macro expansion nested macro calls, advanced macro facilities, design of macro processor

**LINKERS:** Relocation and linking concept design of a linear self-relocating programs, a linker for MS-DOS, Linking for Overlays, loaders, Editors.

### **Text Books:**

1. Operating Systems, William Stallings, 4<sup>th</sup> Edn. Pearson Education.
  2. Modern Operating Systems, Andrew S. Tanenbaum, PHI.
  3. Systems Programming & Operating Systems, D.M.Dhamdhere, 2<sup>nd</sup> Edn. TMH.
  4. IBM PC Assembly language & Programming, Peter Abel, PHI.
  5. Systems Programming, John J. Donovan, Mc Graw Hill.

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II Year B.Tech II Semester

4-0-4 CS2226

**DATABASE MANAGEMENT SYSTEMS**

**UNIT I**

Introduction to database systems: Overview- File systems Vrs DBMS., Various data models – Levels of abstraction – Structures of DBMS – Relational Model – Relations and Integrity Constraints – Relational Algebra and Calculus – SQL – Basic SQL Query – Nested Queries – Aggregate operators – Embedded SQL – Dynamic SQL – Security, views, SQL-QBE.

**UNIT II**

File Organization: Storage media – Buffer management – Record and page formats – File Organizations – various kinds of indexes and external sorting.

**UNIT III**

Query optimization and evaluation: Introduction to Query Processing Selection operation – Projection operation – join operation – set operation and Aggregate operation – Relational Query Optimization – Translating SQL queries – mho algebra – Estimating the cost – Relational Algebra Equivalences.

**UNIT IV**

Database Design: Overview of data base design – ER model – features of ER model – Conceptual design using ER model, scheme refinement and Normal Forms – Schema Refinement – Use of decompositions – functional Dependencies – Normal forms \_ multi valued Dependencies.

**UNIT V**

Concurrency control and recovery: concepts of transaction – Transactions and schedules – Lock based concurrency control – Lock management – specialized locking techniques – Concurrency control without locking – crash recovery – Introduction to crash recovery – Log recovery – check pointing – media recovery.

**TEXT BOOKS:**

1. Database System Concepts, Silberschatz, Korth, Mc Graw Hill, IVedition.
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, Mc Graw Hill, II edition.

**REFERENCE BOOKS:**

1. Database Management and Design, G. W. Hansen and J. V. Hansen, PHI, 1999.
2. Database Management Systems, Alexis Leon, Mathews Leon, Leon Vikas.

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HYDERABAD

II Year B.Tech II Semester

0-3-2 CS2227

**OPERATING SYSTEMS & SYSTEMS PROGRAMMING LAB**

**Operating Systems Related exercises:**

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.

**Systems Programming Related Exercises:**

1. fixed Point arithmetic
2. Text processing
3. Keyboard and screen processing
4. Macro writing
5. Copy protection schemes
6. Adding Syntax directed facilities to an editor

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**II Year B.Tech II Semester**

**0-3-2 CS2228**

**DATABASE MANAGEMENT SYSTEMS LAB**

1. Creating tables for various relations (in SQL)
2. Implementing the queries in SQL for
  - a) Insertion
  - b) Retrieval (Implement all the operation like Union, Intersect, Minus, in, exist, aggregate functions (Min., Max...) etc...)
  - c) Updation
  - d) Deletion
3. Creating Views
4. Writing Assertions
5. Writing Triggers
6. Implementing Operations on relations (tables) using PL/SQL
7. Creating FORMS
8. Generating REPORTS.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**III Year B.Tech I Semester**

**4-0-4 CS3121**

**INTERFACING THROUGH MICROPROCESSORS**

**UNIT-I**

**8086 ARCHITECTURE:**

Functional Diagram, register organization, addressing modes instructions, pc hardware, functional schematic, various terminology.

**UNIT-II**

**ASSEMBLY LANGUAGE PROGRAMMING OF 8086:**

Simple programs, programs using the assembler, implementation of FOR loop, WHILE, REPEAT and IF-THEN-ELSE features, string manipulation procedures, macros.

**UNIT-III**

**INTERFACING I:**

8086 systems bus structure, memory and I/O interfacing with 8086, Interfacing through various IC peripheral chips like 8255, 8257, 8259

**UNIT IV:**

**Interfacing II:**

Interfacing of switches, keyboards, LED's, 7-segment display units, transducers, actuators, stepper motor, A/D and D/A, CRT interface, floppy interface.

**UNIT-V**

**INTERFACING III:**

Serial communication standards, USART interfacing RS-232, IEEE-488, 20mA current loop, prototyping and trouble shooting, software debugging tools, MDS.

**BOOKS:**

1. D. V. HALL: Microprocessors and Interfacing.
2. GIBBSON: Microprocessor Software and Hardware.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**III Year B.Tech I Semester**

**4-0-4 CS3122**

**ARTIFICIAL INTELLIGENCE**

**UNIT I**

**Introduction:**

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

**Heuristic Search Techniques:**

Generate – and – test, hill climbing, Best – First Search, problem reduction, constraint satisfaction, means-ends analysis.

**UNIT II**

**Knowledge Representation:**

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

**UNIT III**

**Reasoning Techniques:**

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

**UNIT IV**

**Game Playing:**

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

**UNIT V**

**Learning:**

Role 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> Edition., E.Rich and K.Knight (TMH).

**REFERENCE BOOKS**

1. Artificial Intelligence A Modern Approach, Russel Norvig, Pearson Education.

## **DATA COMMUNICATIONS**

### **UNIT I:**

Data communication introduction, Basic concepts, The OSI model, Signals, Encoding and modulation, Transmission of digital data, Interfaces and modems (chapters 1-6 of text book –1).

### **UNIT II:**

Data Communication standards, Circuits, Codes, Error control, Synchronization, Serial and parallel interface hardware, Data modems (CCITT recommendations are not needed), Data communication Protocols, Asynchronous and Synchronous protocols, Public data networks (upto page –631) – (Chapters 13, 14 of text book –2).

### **UNIT III:**

Local Area networks, Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, Token bus, Token ring, FDDI, metropolitan area networks, DQDB, SMDS, Point-to-Point protocols, PPP layers, LCP, NCP, Authentication (chapters 12, 13, 15 of text book – 1).

### **UNIT IV:**

Switching, Circuit, Packet and message switching, ISDN, Subscriber access to ISDN, ISDN layers, B-ISDN, X.25 layers, (Chapters 14, 16, 17 of text book –1).

### **UNIT V:**

Frame relay, Operation Layers, ATM, Architecture of ATM, Switching in ATM networks, ATM layer, ATM service classes, SONET, Configuration of SONET, SONET layers, SONET frame (Chapters 18, 19, 20 of text book-1).

#### **Text Books:**

1. Data Communications and Networking B. A. Forouzan, 2<sup>nd</sup> Edition TMH
2. Electronic Communications Systems, W. Tomasi, 4<sup>th</sup> Edition, Pearson Education.

#### **Reference Books:**

1. Data Communications, Computer Networks and Open Systems, Fred Halsall, 4<sup>th</sup> Edition, Pearson Education.
2. Data and Computer Communications, W. Stallings, 6<sup>th</sup> Edition, Pearson Education.
3. Data Communications and Networking, A. S. Godbole, TMH.

## **THEORY OF COMPUTATION**

### **UNIT I:**

Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, non deterministic finite automaton, deterministic finite automaton, equivalence between NFA and DFA, Conversion of NFA into DFA, minimisation of FSM, equivalence between two FSM's, Moore and Melay machines.

### **UNIT II:**

Regular sets, regular expressions, identity rules, manipulation of regular expressions, equivalence between RE and FA, inter conversion, pumping lemma, closure properties of regular sets (proofs not required), regular grammars, right linear and left linear grammars equivalence between regular linear grammar and FA, inter conversion, enumeration of properties of CFL (proofs omitted).

### **UNIT III:**

Context free grammar, derivation trees, Chomsky normal form, Greiback normal form, push down automata, definition, model, acceptance of CFL, equivalence of CFL and PDA, interconversion, enumeration of properties of CFL (proofs omitted).

### **UNIT IV**

Turing Machine, definition, model, acceptance of CFL, equivalence of CFL and PDA, inter conversion, enumeration of properties of CFL (Proofs omitted).

### **UNIT V:**

Chomsky hierarchy of languages, linear bounded automata and context sensitive language, Introduction to DCFL and DPDA, 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 BOOK:**

1. Hopcroft H.E. and Ullman J. D. "Introduction to Automata Theory Languages and Computation".
2. Lewis H.P. & Papadimitri C.H. "Elements of Theory of Computation", Prentice Hall.

#### **REFERENCE BOOKS :**

1. Introduction to languages and the Theory of Computation, John C Martin, Mc Grawhill
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.

**PRINCIPLES OF PROGRAMMING LANGUAGES****UNIT-I**

Preliminary Concepts: Significance of programming language study. Issues in Design – Programming domains, Evolution & good design criteria. Implementation – Translation and Virtual machines and programming Imperative, OOP, Functional programming, programming paradigms.

Syntax and Semantics: General problem of describing syntax and semantics  
– BNF, FSA, PDA, Attribute grammar, derivation semantics, NL overview, Program verification, Algebraic Data types.

**UNIT-II**

Data types and Variables: Primitives and non primitives data types, Variables, type checking, type compatibility, strong types, type conversion and scope and extent of variables.

Expressions: Arithmetic, Relational and Boolean expression, short circuit evaluation, assignment statements, mixed mode assignment, ( referential transparency and functional programming)

**UNIT-III**

Control Structures: Statement level control structures, compound statements, selection, iterative, unconditional statements and general commands.

Subprograms: Fundamentals of subprograms, design issues of subprogram, parameter passing method, passing subprogram as parameters, overloaded subprograms and operations, generic subprograms, separately compiled modules, co routines.

**UNIT-IV**

Abstract Data types: Abstraction and encapsulation, Introduction to data Abstraction, design issues, language examples, C++ parameterized abstract data types.

Concurrency: Subprogram level concurrences, semaphores, monitors, message passing, concurrency in Ada, Java threads.

**UNIT-V:**

Exception Handling : Variables on subprogram control, exceptions and exception handling. Exception handles in C++ and Java

Functional Programming Languages:

Introduction, Mathematical Functions, Fundamentals of Functional Programming Languages, LISP, ML, Haskell, Applications of Functional Languages, A Comparison of Functional and Imperative Languages.

Logic Programming Languages: Introduction, An Overview of Logic Programming, The Basic Elements of Prolog, applications of Logic Programming.

**TEXT BOOKS:**

1. Concepts of Programming Languages 4<sup>th</sup> Edition, Robert W. Sebesta ( Addison Wesley)
2. Programming Languages – Design and Implementation 4<sup>th</sup> Edition, Terrence W. Pratt & Marvin, V.Zelkowitz ( PHI)

**REFERENCE BOOKS:**

Programming Language pragmatics ,Michael L. Scott ,Harcourt Asia Morgan Kaufmann.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**III Year B.Tech I Semester**

**4-0-4 CS3126**

**OBJECT ORIENTED ANALYSIS AND DESIGN THROUGH UML**

**UNIT-I:**

Object Oriented Analysis and Design : Concepts, complexity of Software, structure of complex Systems, designing complex system

Object model: Evolution, Elements and applications, Nature of classes and objects, relationships among them, Building quality classes and objects-classification and identification of classes and objects.

Introduction to UML: The meaning of object orientation, Object Identity Encapsulation, Information hiding, Polymorphism, genericity, Importance of modeling, Principles of modeling, Object oriented modeling,, conceptual model of the UML- architecture.

**UNIT-II:**

Basic structural modeling: Classes, relationships, common mechanisms, diagrams, advanced structural modeling: advance relationships interfaces roles, packages, instances.

**UNIT-III:**

Class and Object diagrams: Terms, concepts, examples, Modeling technique class and object diagrams.

Collaboration diagrams : Terms, concepts, depicting a message, Polymorphism in collaboration diagrams, iterated messages, use of self-in messages.

Sequence diagrams: Terms, concepts, difference between collaboration and sequence diagrams, depicting synchronous messages with/without priority callback mechanism, broadcast messages.

**UNIT-IV:**

Behavioral modeling: interactions, Use cases, Use case Diagrams, Activity Diagrams.

Advanced Behavioral Modeling: Events and signals, state machines, process and Thread, time and space, state chart diagrams.

**UNIT-V:**

Architectural Modeling : Terms, Concepts, examples, modeling techniques for component diagrams and deployment diagrams.

**Text Books :**

1. Object Oriented Analysis and Design with Applications- Pearson Edn Asia, Grady Booch 2<sup>nd</sup> Edition.
2. The Unified Modeling Language user guide-Addison Wesley,1999.Grady Booch, James rumbaugh, Ivar Jacobson.
3. Fundamentals of Object Oriented Design in UML, Addison Wesley,2000. Meilir Page-Jones.

**INTERFACING THROUGH MICROPROCESSORS LAB****8086 Assembly Language Programming Exercises:**

1. 16-bit addition
2. Sorting the n numbers in ascending & descending order.
3. Sum of squares of n numbers, sum of cubes of n numbers
4. Arithmetic mean of n numbers.
5. Interfacing of switch and display
6. Interfacing of A/D converter
7. Interfacing of D/A converter
8. Stepper motor control using microprocessor
9. Interfacing Keyboard/Display controller
10. Implementation of real time clock
11. Microprocessor based temperature controller
12. Microprocessor based traffic controller

**UML LAB**

The student is expected to take up about five mini-projects and model them and produce Use Cases, Analysis Documents – both static & dynamic aspects, Sequence Diagrams and State-Gcharts, Database Design. A sample collection of ideas is given. Numerous other ideas can be found in the pages from the list of references given below.

**Mini-Project – I: A Point-of-Sale (POS) System**

A POS system is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services are temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client-side terminals and interfaces such as browser, PDAs, touch-screens.

**Mini-Project – II: Online Bookshop Example**

Following the model of amazon.com or bn.com, design and implement an online bookstore.

**Mini-Project – III: A Simulated Company**

Simulate a small manufacturing company. The resulting application will enable the user to take out a loan, purchase a machine, and over a series of monthly production runs, follow the performance of their company.

**Mini-Project – IV: A Multi-Threaded Airport Simulation**

Simulate the operations in an airport. Your application should support multiple aircrafts using several runways and gates avoiding collisions/conflicts.

**Landing:** an aircraft uses the runway, lands, and then taxis over to the terminal.

**Take-Off:** an aircraft taxis to the runway and then takes off

### **Mini-Project – V: An Automated Community Portal**

Business in the 21st Century is above all BUSY. Distractions are everywhere. The current crop of "enterprise intranet portals" are often high noise and low value, despite the large capital expenditures it takes to stand them up. Email takes up 30 - 70% of an employee's time. Chat and Instant Messaging are either in the enterprise or just around the corner. Meanwhile, management is tasked with unforeseen and unfounded leadership and change-agent roles, as well as leadership development and succession management. What is needed is a simplified, repeatable process that enhances communications within an enterprise, while allowing management and peers to self-select future leaders and easily recognize high performance team members in a dynamic way.

Additionally, the system should function as a general-purpose content management, business intelligence and peer-review application.

Glass code's goal is to build that system. The software is released under a proprietary license, and will have the following features:

#### **Remote, unattended moderation of discussions**

However, it will have powerful discovery and business intelligence features, and be infinitely extendable, owing to a powerful API and adherence to Java platform standards.

Encourages peer review and indicates for management potential leaders, strong team players and reinforces enterprise and team goals seamlessly and with zero administration.

### **Mini-Project – VI: A Content Management System**

The goal is to enable non-technical end users to easily publish, access, and share information over the web, while giving administrators and managers complete control over the presentation, style, security, and permissions.

#### **FEATURES:**

- v Robust Permissions System
- v Templates for easy custom site designs
- v Total control over the content
- v Search engine friendly URL's
- v Role based publishing system
- v Versioning control
- v Visitor profiling

### **Mini-Project – VII: An Auction Application**

Several commerce models exist and are the basis for a number of companies like eBay.com, priceline.com etc. Design and implement an auction application that provides auctioning services. It should clearly model the various auctioneers, the bidding process, auctioning etc.

### **Mini-Project – VIII: A Notes and File Management System**

In the course of one's student years and professional career one produces a lot of personal notes and documents. All these documents are usually kept on papers or individual files on the computer. Either way the bulk of the information is often erased corrupted and eventually lost. The goal of this project is to build a distributed software application that addresses this problem. The system will provide an interface to create, organize and manage personal notes through the Internet for multiple users. The system will also allow users to collaborate by assigning permissions for multiple users to view and edit notes.

### **Mini-Project – IX: A Customizable Program Editor**

A programmer's editor which will be focused on an individual programmer's particular needs and style. The editor will act according to the specific language the current source file is in, and will perform numerous features, such as auto-completion or file summarization, on the file. These features will be able to be turned on or off by the programmer, and the programming style of the user will be used to create as efficient an editing environment as possible.

### **Mini-Project – X: A Graphics Editor**

Design and implement a java class collection that supports the construction of graph editing applications, i.e., applications that include the ability to draw structured and unstructured diagrams.

E.g.

The goal of the GEF project is to build a graph editing library that can be used to construct many, high-quality graph editing applications. Some of GEF's features are:

A simple, concrete design that makes the framework easy to understand and extend.

Node-Port-Edge graph model that is powerful enough for the vast majority of connected graph applications.

Model-View-Controller design based on the Swing Java UI library makes GEF able to act as a UI to existing data structures, and also minimizing learning time for developers familiar with Swing.

High-quality user interactions for moving, resizing, reshaping, etc. GEF also supports several novel interactions such as the broom alignment tool and section-action-buttons.

Generic properties sheet based on Java Beans introspection.

XML-based file formats based on the PGML standard

#### **Text Book(s):**

"Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and the Unified Process", Craig Larman, Pearson Education Asia, 2002, 2<sup>nd</sup> Edition, ISBN: 81-7808-549-6

#### **Reference(s):**

"Object Oriented Systems Analysis and Design using UML", Simon Bennet, Steve McRobb, and Ray Farmer, McGraw Hill, 2002, 2<sup>nd</sup> Edition, ISBN: 0-07-709864-1.

"Object-Oriented Analysis & Design," Andrew Haigh, Tata McGraw-Hill, 2001, ISBN: 0-07-047277-7.

#### **Various Net Resources and projects:**

<http://user-mode-linux.sourceforge.net/case-studies.html>

<http://www.onesmartclick.com/programming/case-studies.html>

<http://www.tigris.org/servlets/ProjectList?type=Projects>

<http://hotscripts.com/>

<http://www.developingwebs.net/>

<http://sourceforge.net/projects/>

<http://governing.com/gpp/gponline.htm>

<http://www.cio.com/research/government/gov.html>

<http://www.whitehouse.gov/omb/inforeg/egovstrategy.pdf>

<http://www.andhrapradesh.com/>

<http://www.ap-it.com/>

<http://www.aponline.gov.in>

#### **MANAGEMENT SCIENCE (Common for all branches).**

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

###### **Introduction to Management:**

Concepts of Management and Organization – Functions of management – Evolution of Management Thought: Taylor's Scientific Management, Fayol's Principles of management, Douglas Mc Gregor's theory X and Theory Y, Mayo's Hawthorne Experiments, Herzberg's Two Factor theory of Motivation, Maslow's Hierarchy of Human Needs – Systemic Approach to Management – Principles of Organization – Types of Organization, Types of Organization Structure: Line Organization, Functional Organization and Line and staff Organization, Matrix Organization – Managerial Objectives – Social Responsibilities.

##### **UNIT II:**

###### **Introduction to Operations Management:**

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:**

Materials management – objectives of Inventory control – EOQ-ABC Analysis – Purchase Procedure – stores – Management and stores records.

Marketing : Marketing vs Selling ,Marketing Mix, Stages in Product Life Cycle Channels of Distribution .

##### **UNIT III :**

###### **Introduction to Human Resource Management (IIRM) :**

The concepts of IIRM ,Human Resource Development (HRD) and Personal Management & Industrial Relations (PMIR)-HRM vs PMIR, Basic Function of HR Manager : Manpower Planning ,Recruitment ,Selection ,Training, development , Palcement ,Wage and Salary administration promotion ,transfer, separation, Performance appraisal , grievance handling and welfare administration , job evaluation and Merit Reading.

**UNIT IV :****Introduction to Strategic Management :**

Corporate Planning Process : Mission , goals , objectives , policy , strategy  
 Programmes-Elements of Corporate Planning Process – Environmental Scanning : External Environment Analysis , SWOT Analysis \_ Stages in Strategy Formulation and Implementation .

**UNIT V:****Introduction to PERT/CPM**

Network Analysis – Project Management – Programme Evaluation and Review Technique (PERT) vs Critical Path Method (CPM) – Identifying Critical Path – Probability of Completing the Project Within Given Time under PERT, Project Cost Analysis , Project Crashing.

**Books for Reference :**

1. Koontz and O'Donnell ,Principals of Management ,McGraw-Hill , 2001.
2. Phillip Kotler , Marketing , Management ,(11<sup>th</sup> Ed 2002) Prentice Hall of India.
3. Gary Dessler , Human Resource Management , Pearson Education Asia ,2002
4. L.S.Srinath , PERT/CPM , Affiliated East-West Press, New Delhi ,2002
5. W.Glueck & L.R.Jauch, Business Policy and Strategic, Management, McGraw-Hill, 1998
6. A.R.Aryasri, Management Science For JNTU(B.Tech), Tata McGraw-Hill,2002
7. O.P.Khanna, Industrial Engineering & Management, Dhanpat Rai, 1999
8. Chandra Bose , Management And Administration, Prentice Hall,2002.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**
**III Year B.Tech II Semester****4-0-4 CS3222****COMPUTER GRAPHICS****UNIT I:**

Introduction to Computer Graphics: Points, Lines, Planes, Pixels, Frame Buffers, Video display devices, Logical and Physical Interactive devices, scanners,

Line drawing algorithms - DDA and Bresenham's. Bresenham's algorithm for circle and ellipse generation. Scan conversion and generation of display, Image compression, polygon generation, polygon filling algorithms, anti aliasing, Halftoning.

**UNIT II:**

Two Dimensional transformations: Scaling, Rotation, Translation, homogeneous coordinates. Rotating about an arbitrary point, reflection zooming, shear.

Windowing and Clipping: window, view port, viewing transformations. Clipping, line and polygon clipping generalized clipping, multiple windowing.

**UNIT III:**

3D Graphics: 3D Transformations, composition of 3D transformations, projections, 3D viewing, hidden surfaces, Z buffer algorithms, painter's algorithm, shading algorithm.

**UNIT IV:**

Curves and Surfaces: Generation of curve and surfaces using Hermit Bezier and B - Spline, sweeping method of interpolation.

Color chromatic, Trichromatic color theory, color models for raster graphics reproduction of color.

**UNIT V:**

Rendering: Models transparency, shadows, textures mapping.

Animation: conventional and computer assisted animation. Animation languages. Methods of controlling animation. Basic rules of animation. Problems peculiar to animation.

**TEXT BOOKS:**

- 1) Procedural Elements for Computer Graphics. David F. Rogers McGraw-hill International 2<sup>nd</sup> edition.
- 2) Computer Graphics principles and practices Foley, Vandam, Friner, Hughes: Pearson Education Asia
- 3) Computer Graphics, Steven Harrington - TMH
- 4) Computer Graphics, Donald Hearn & Pauline Baker PHI (EEE).

**Reference:**

1. Introduction to Computer Graphics N. Krishna Murthy, TMH
2. Computer Graphics for scientists and engineers, R. G. S. Asthana and N. K. Sinha, New Age International (P) Ltd.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

III Year B.Tech II Semester

4-0-4 CS3223

**COMPUTER NETWORKS****Unit-I:**

Review of protocol layering, Data link layer, Design issues, Elementary data link protocols, Sliding window protocol, Example data link protocols.

**Unit-II:**

The medium access sublayer, Channel allocation problem, Multiple access protocols, Review of IEEE standards for LANs, LAN bridges.

**Unit-III:**

The network layer, Design issues, Routing algorithms, Congestion control algorithms, The Transport layer, Transport services, Transport protocols.

**Unit-IV:**

Internetworking, Internet network layer, Internet transport protocols (TCP and UDP), ATM network layer, ATM transport protocols.

**Unit-V:**

The application layer, Security, DNS, SNMP, Electronic Mail, WWW, Multi-media.

**TEXT BOOK:**

1. Computer Networks: A. S. Tanenbaum, 3<sup>rd</sup> Edition, PHI.

**Reference Books:**

1. An engineering Approach to Computer Networking, S. Keshav, Pearson Education.
2. Computer Networking a Top-Down Approach Featuring the Internet, J. F. Kurose, K. W. Ross, Pearson Education.
3. Data Communications and Networking, A. S. Godbole, TMH.
4. Elements of Network Protocol Design, Gouda, John Wiley.
5. High Speed Networks and Internets, W. Stallings, Pearson Education.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,**

HYDERABAD

**III Year B.Tech II Semester****4-0-4 CS3224****ADVANCED COMPUTER ARCHITECTURE****UNIT I**

Trends towards parallel processing, parallelism in uniprocessor systems, parallel computer structures, architectural classification schemes, parallel processing applications, memory hierarchy in parallel processing systems, addressing schemes. Pipeline concept, linear pipelining and space time diagram, classification of pipeline processors, nonlinear pipeline and reservation table, interleaved memory organization, arithmetic pipelines, principles of designing pipeline processors, vector processing.

**UNIT II**

SIMD array processors, organization, masking and routing mechanisms, inter PE communications, SIMD inter connection networks, single stage and multi stage networks, mesh connected Illiac networks, parallel shifter, shuffle exchange and omega networks, parallel algorithms for array processors, matrix multiplication, polynomial evaluation, parallel sortings, fast fourier transform computation, associative array processor.

**UNIT III**

Multiprocessor architecture, loosely coupled and tightly coupled multiprocessor systems, processor characteristics, interconnection networks crossbar switch and multi port memories, multi stage networks, banyan and delta networks parallel memory organization, multiprocessing operating systems, classification and requirements, software requirements for MPS, language features to exploit parallelism, multi processor scheduling strategies, parallel algorithms.

**UNIT IV**

Data flow computers, control flow versus data flow, data flow computer architectures, data flow graphs, data flow languages, Dennis and Irvine machines, dataflow design alternatives, dependence driven and multi level event driven approaches, VLSI computing structures, systolic array architecture, VLSI matrix arithmetic processor.

**UNIT V**

Performance evaluation of computers, measurements and parameters, stochastic model simulation model, study of architecture of Cray and Cyber super computers, massively parallel processor systems, image processing on MPP, C.mmp multiprocessor system, crazy X MP super computer.

**TEXT BOOKS:**

1. "Computer Architecture and parallel processing", Hwang K, Briggs F.A McGraw Hill.
2. Scalable Parallel Computing , K. Hwang, Z. Xu, Mc Graw Hill.

**REFERENCE:**

1. Advanced Computing Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Person education.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**III Year B.Tech II Semester**

**4-0-4 CS3225**

**LANGUAGE PROCESSORS**

**UNIT-I**

Basic functions of language translator, difference between compiler and interpreter, boot strapping, logical phases of a compiler, difference between a pass and a phase. Lexical analysis, reasons for separating lexical analysis from syntax analysis, finite automata and state diagram, scanning algorithm, regular expressions, LEX program to perform Lexical analysis of high level languages (PASCAL and C) typical lexical errors.

**UNIT-II**

Type grammars, parse tree, ambiguity in writing grammars, methods to remove ambiguity, methods of parsing, topdown and bottom-up concepts, Brute-Force method, top-Down parsing problems and solutions, recursive descent parsing, LL(1) grammars, error handling, bottom-up methods, operator precedence, simple precedence operator grammar, precedence functions, parsing of LR(k) and LALR(k) grammars, error handling, system directed translation, syntax directed definitions, construction of syntax trees, bottom-up evaluation of s-attributed definitions, 1-attributed definitions, top-down translation, bottom-up evaluation of inherited attributes.

**UNIT III**

Semantic analysis, typical semantic errors, type checking, type conversion, specification of a simple type checker, equivalence of type expressions, overloading of functions and operators polymorphic functions, storage allocations, strategies of storage allocation, static, dynamic tables, organization, data structures for symbol table, trees, arrays, linked lists, hash tables, factors.

**UNIT IV**

Intermediate code forms, polish notation, quadruples, triples, indirect triples, trees, abstract machine code, transformation into internal forms, semantic routines, translation grammars, code generation, machine dependent and machine independent code generation, peephole optimization, folding, elimination of redundant operations, loop optimization, frequency reduction, strength reduction, global flow analysis.

**UNIT V**

Code generation, forms of object code, machine dependent code optimization, register allocation for temporary and user defined variables, reducing the memory access times by exploiting addressing modes, assemblers, phases of an assembler, design of assembler, symbol tables, macros, phases of a macro processor, design of a macro processor.

**BOOKS:**

1. "Principles of compiler design", Ullman – Narosa.
2. "Compilers Principles, Technique and tools" Aho Ullman & Raviseetty Addison Wesley

**REFERENCE:**

1. "Theory and practice of compiler writing", Trembley and Sorenson: Mc.Graw Hill.
2. "Systems Software", Dhamdher Prentice hall.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**III Year B.Tech II Semester**

**4-0-4 CS3226**

**ADVANCED UNIX PROGRAMMING**

**UNIT I:**

**Unix Utilities – 1**

Introduction to Unix file system. Vi editor, File handling utilities, security by file permissions, process utilities, disk utilities, Networking commands, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, umask, ulimit, ps, who, w, finger, arp, ftp, telnet, rlogin.

**Unix utilities – 2**

Text processing utilities and backup utilities detailed commands to be covered are: cat, tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, more, pg, comm., cmp, diff, tr, awk, tar, cpio.

What is a shell, shell responsibilities, pipes and input redirection, Output redirection and here documents, the shell as programming Language shell variables, conditions, history and control structures and shell programming.

**UNIT II:**

**Unix Internals - 1**

Unix file structure, directories, files and devices, system calls and device drivers, Library functions, low-level file access (write, read, open, close, ioctl, lseek, fstat, stat, dup and dup2), the standard I/O (open, fread, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted, I/O stream errors, streams, and file descriptors, file and directory maintenance (chmod, chown, unlink, link symlink, mkdir, rmdir, chdir, getcwd).

**UNIT III:**

**Unix internals – 2**

Process and signals:- what is process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, fork Function, vfork, exit, wait, exec, system, functions, user identification, process times.

**Signal:** Signal functions, reliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, system, sleep functions.

**UNIT IV:**

**Unix Internals – 3**

**Data Management:-** Management Memory (simple memory allocation, freeing memory) file locking (creating lock files, locking regions, use of read/write locking, competing locks, other commands, deadlocks).

**UNIT V:**

**Unix Internals – 4**

**Inter-process:-** Pipe, process pipes, the pipe call, parent-child process, named pipes: FIFOs, Semaphores, message queues and shared memory applications of IPC.

**TEXT BOOKS:**

1. Advanced programming in Unix Environment, W. Richard Stevens.
2. Unix Network Programming, W. Richard Stevens.

**REFERENCE:**

1. Unix network Programming: Networking, API, Sockets, XTI vol I, II edition, W. Stevens, PHI.
2. Unix Network programming, Inter process communication vol II, II edition, W. Stevens, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD

III Year B.Tech II Semester

0-3-2 CS3227

**LANGUAGE PROCESSORS LAB**

1. Develop a lexical analyzer to recognize a few patterns in PASCAL, C and FORTRAN (Ex: identifiers, constants, comments, operators, etc.,).
2. Write a program to parse using Brute force technique of Topdown parsing
3. Develop an LL(1) parser (construct parse table also).
4. Develop an operator precedence parser (Construct parse table also)
5. Develop a recursive descent parser
6. Write a program for generating various intermediate code forms
  - i) Three address code
  - ii) Polish notation
7. Write a program to simulate heap storage allocation strategy
8. Generate Lexical analyzer using LEX.
9. Generate YACC specification for a few syntactic categories.
10. Given any intermediate code form implement code optimization techniques.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD

III Year B.Tech II Semester

0-3-2 CS3228

**ADVANCED UNIX PROGRAMMING LAB**

1. Write a shell script for sorting, searching and insertion / deletion of elements in a list.
2. Create two processes to run a for loop which adds numbers 1 to n, say one process adds odd numbers and the other even.
3. By creating required number of processes, simulate a communication between them as below:
  - (1). Process I sends to process j in the format: I, j, data , and process j prints the same after reading it.
  - (2). If two or more processes send data to the same process j, they will wait and process j all the data at the end of complete reception.
- (3). Establish a two-way communication between a specific processes only.
4. Create a file that is shared among some users. Write a program that finds whether a specific user has created, read or write operations on the file.
5. Create a shared lock and exclusive lock among some number of processes, say 1 to 10 on any data of 100 elements. For example process 5 wants a shared lock on elements 5 to 50 or process 8 wants exclusive lock on elements 32 to 45. Create access violations on the locks and show what occurs, then.
6. Create a semaphore operation on a shared file for write but not read.
7. Create a distributed key among some processes which exchange messages of the form (m,T<sub>j</sub>,l) for resource sharing, where m = request, reply, release, , T<sub>j</sub> = time stamp and l = process id.
8. Show mutual exclusion in problem 7 above.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,****HYDERABAD****IV Year B.Tech I Semester****4-0-4 CS4121****SOFTWARE ENGINEERING****UNIT-I**

Software and Software Engineering, The importance of software – software – software myths – software engineering paradigms – generic view of software engg. Software metrics. Measures and metrics – estimation – risk analysis – scheduling – Size oriented Metrics – function oriented metrics – Metrics – metrics of software quality.

**UNIT II**

Software project estimation and planning, Decomposition techniques – LOC and FP estimation – effort estimation – risk analysis – identification – projection – assessment – management and monitoring – software re-engineering. Requirement analysis. Requirement analysis – tasks – analyst – software prototyping – specification principles – representation and the software requirements specification.

**UNIT III**

Object oriented analysis and data modeling – Object oriented concepts – identifying objects – specifying attributes – defining operations – inter object communication – finalizing object definition – object oriented analysis modeling – data modeling – data objects, attributes and relationships – entity relationship diagrams. Alternative analysis techniques requirement analysis methods – data structured oriented methods – data structured system development – Warner diagrams and the DSSD approach – Jackson system development.

**UNIT IV**

Software design fundamentals – the design process – design fundamentals – effective modular – design – data flow oriented design – transform analysis – transaction – analysis – design heuristics. Object Oriented design – methods – refining operations – Program components & interfaces – implementation detail design. User interface design – human factors – human computer interface design – interface – design guidelines – Interface standards.

**UNIT V**

Software quality Assurance – Software quality factors – Quality assurance, quality metrics – Halstead's S/W Science. Software, Testing Techniques S/W testing fundamentals – White Box testing, Blackbox – testing, Validation Testing, system Testing, debugging, software maintenance maintainability – maintenance tasks – Reverse engineering and Re-engineering.

**TEXT BOOK:**

Software Engineering, Roger S. Pressman Mc Graw Hill.

**REFERENCE:**

1. Object Oriented Analysis, Peter Coad, Edward yourdon, Pearson Education.
2. Object Oriented Systems Development, Ali Bahrami, Mc Graw Hill

2002 – 2003

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,

HYDERABAD

IV Year B.Tech I Semester

4-0-4 CS4122

### DISTRIBUTED SYSTEMS

#### UNIT I:

Characterization of Distributed Systems, Design Issues, User requirement, Network Technologies and Protocols, IPC, Client-server communication, Group communication, IPC in UNIX.

#### UNIT II:

Remote Procedure Calling, Design issues, Implementation, Asynchronous RPC.

Distributed OS, its Kernel, Processes and Threads, Naming and Protection, Communication and Invocation, Virtual memory, File service components, Design issues, Interfaces, Implementation techniques, SUN Network File System

#### UNIT III:

SNS – a name service model, its design issues, Synchronizing physical clocks, Logical time and logical clocks, Distributed coordination, Replication and its architectural model, Consistency and request ordering, Conversation between a client and a server, Transactions, Nested Transactions.

Concurrency control, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

#### UNIT IV:

Distributed Transactions and Nested Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed Deadlocks, Transactions with replicated data, Transaction recovery, Fault tolerance, Hierarchical and group masking of faults.

2002 – 2003

#### UNIT V:

Cryptography, Authentication and key distribution, Logics of Authentication, Digital signatures.

Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy, Release consistency and Munin, Overview of Distributed Operating systems Mach, Chorus.

#### Text Books:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Second Edition, Addison Wesley

#### REFERENCE BOOKS:

Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,****HYDERABAD****IV Year B.Tech I Semester****4-0-4 CS4123****MULTIMEDIA AND WEB DESIGN****UNIT I:**

Review of HTML 4 – Common tags- HTML tables and formatting-internal linking – complex html forms- introduction to scripting languages-Java scripts-control structures - functions. (Chapters 3,4,8,9,10,11)

**UNIT II:**

Java Script- arrays and objects- Dynamic HTML – CSS- event model-filters and transitions-data binding with tabular control (Chapters 12-18).

**UNIT III:**

Introduction to multimedia- digitizing video- video standards- compression techniques –Animation- 3-D animation –sound –compression-formats- combining media- synchronization.(Chapters 10,11,12,13 of Digital multimedia by Chapman and Chapman)

**UNIT IV:**

Multimedia application to Web- adding background sound - creating animation-adding video using windows Media Player ActiveX control- creating multimedia applications using java.(Chapters 19,20,21 and Chapter 16 of Java How to program by Deitel and Deitel )

**UNIT V:**

Introduction to Web servers - server side scripting – use of ASP – server side ActiveX components – accessing database –CGI and server side design – introduction to use of XML in web design- introduction to servlets. (Chapters 26,27,28,29)

**Text books:**

- 1) Internet and World Wide Web- How to Program by Deitel, Deitel, and Nieto Pearson Education Asia.
- 2) Digital Multimedia by Nigel Chapman and Jenny Chapman – John Wiley & Sons LTD.
- 3) Java How To Program Deitel and Deitel, Pearson Education Asia.

**Reference:**

Multimedia Communications, Fred Halsall, Pearson Education.

**REFERENCE BOOKS:**

1. Digital Multimedia, Nigel chapman and Jenny Chapman, John wiely.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,****HYDERABAD****IV Year B.Tech I Semester****4-0-4 CS4124****NETWORK SECURITY AND CRYPTOGRAPHY****UNIT-I****INTRODUCTION:**

Attacks, Services and Mechanisms, Security attacks, Security services, A Model for Internetwork security. Classical Techniques: Conventional Encryption model, Steganography, Classical Encryption Techniques. Modern Techniques: Simplified DES, Block Cipher Principles, Data Encryption standard, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operations.

**UNIT-II**

Algorithms: Triple DES, International Data Encryption algorithm, Blowfish, RC5, CAST-128, RC2, Characteristics of Advanced Symmetric block ciphers.

Conventional Encryption: Placement of Encryption function, Traffic confidentiality, Key distribution, Random Number Generation. Public Key Cryptography: Principles, RSA Algorithm, Key Management, Diffie-Hellman Key exchange, Elliptic Curve Cryptography.

**UNIT-III**

Number theory: Prime and Relatively prime numbers, Modular arithmetic, Fermat's and Euler's theorems, Testing for primality, Euclid's Algorithm, the Chinese remainder theorem, Discrete logarithms. Message authentication and Hash functions:

Authentication requirements and functions, Message Authentication, Hash functions, Security of Hash functions and MACs. Hash and Mac Algorithms: MD File, Message digest Algorithm, Secure Hash Algorithm, RIPEMD-160, HMAC. Digital signatures and Authentication protocols: Digital signatures, Authentication Protocols, Digital signature standards.

**UNIT-IV**

Authentication Applications: Kerberos, X.509 directory Authentication service. Electronic Mail Security: Pretty Good Privacy, S/MIME.

**UNIT-V**

IP Security: Overview, Architecture, Authentication, Encapsulating Security Payload, Combining security Associations, Key Management. Web Security: Web Security requirements, Secure sockets layer and Transport layer security, Secure Electronic Transaction. Intruders, Viruses and Worms: Intruders, Viruses and Related threats. Fire Walls: Fire wall Design Principles, Trusted systems.

**Text Books:**

1. Cryptography and Network Security: Principles and Practice - William Stallings, Pearson Education., 2000.

**REFERENCE BOOKS:**

1. Principles of Network and Systems Administration , Mark Burgess, John Wiel

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**IV Year B.Tech I Semester**

**4-0-4 CS4125**

**(Elective I) VLSI SYSTEMS DESIGN**

**UNIT – I:**

Introduction to Digital Systems and VLSI

Why Design Integrated Circuits? Integrated Circuit (IC) Manufacturing – Technology and Economics. CMOS Technology. IC Design Techniques.

**Unit – II:**

Transistors and Gates

Transistors and Layout. Fabrication Processes. Transistors. Wires and Vias. Design Rules. Layout Design and Tools.

Logic Gates. Combinational Logic Functions. Static Complementary Gates. Wires and Delay. Switch Logic. Alternative Gate Circuits.

**Unit – III:**

Combinational Networks and Sequential Machines

Combinational Logic Networks. Layout Design Methods. Simulation. Combinational Network Delay. Crosstalk. Power Optimization. Switch Logic Networks. Combinational Logic Testing.

Sequential Machines. Latches and Flip-Flops. Sequential Systems and Clocking Disciplines. Sequential System Design. Power Optimization. Design Validation. Sequential Testing.

**Unit – IV:**

Subsystem Design, Floor Planning, and Architecture Design

Subsystem Design Principles. Combinational Shifters. Adders. ALUs. Multipliers. High-Density Memory. Field Programmable Gate Arrays. Programmable Logic Arrays. Floor Planning Methods. Off-Chip Connections.

Architecture Design. Register-Transfer Design. High-Level Synthesis. Architecture for Low Power. Architectural Testing.

**Unit – V:**

Chip Design and CAD Systems & Algorithms

Design Methodologies for Chip Design. Case Studies: Timer Chip and PDP-8 Data Path.

CAD Systems. Simulation. Layout Synthesis. Layout Analysis. Timing Analysis and Optimization. Logic Synthesis. Test Generation. Sequential Machine Optimizations. Scheduling and Binding. Hardware/Software Co-Design.

**Text Book(s):**

1. "Modern VLSI Design: Systems on Silicon," Wayne Wolf, Pearson Education Asia, 1998, 2<sup>nd</sup> Edition, ISBN: 81-7808-128-8.
2. "Introduction to VLSI Circuits and systems", John P.Uyemura, John Wiley and sons, 2002, ISBN: 9971-51-417-6

**Reference(s):**

1. "Application Specific Integrated Circuits," Michael John Sebastian Smith, Pearson Education Asia, 1997, Low Priced Indian Edition, ISBN: 81-7808-007-9.

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IV Year B.Tech I Semester

4-0-4 CS4126

(Elective I) MATHEMATICAL MODELLING AND SIMULATION

**UNIT I**

Art of modeling, Types of Models, Mathematical Models, Solution Methods Analytical, Numerical and Heuristic. Linear Programming – Formulation, Graphical Method, Simplex Method, Dual Simplex Method and Applications. Transportation and Assignment Models.

A Brief Introduction to Integer and Non-linear Programming.

**UNIT II**

Deterministic Inventory Models – General Inventory Model, Static EOQ Models and Dynamic Inventory Model. Probabilistic Inventory Models – Continuous Review Models, Single-Period Models and Multiperiod Model. Selective Inventory Control ABC, VED and FSN Analyses. Inventory Systems – Fixed Order Quantity System, Two-bin System, Periodic Review System, Optional Replenishment System and MRP.

**UNIT III**

Queueing Theory – Basic Structure of Queueing Models, Role of Exponential Distribution, Birth-and-Death Process, Queueing Models Based on the Birth-and Death Process, Queueing Models involving Non-exponential Distributions, Priority Discipline Queueing Models and Queueing Networks. Applications of Queueing Theory – Decision Making, Formulation of Waiting-Cost Function and Decision Models.

**UNIT IV**

CPM and PERT – Network Representation, Critical Path Calculations, Construction of Time Schedule. Simulation-Introduction, General Principles Random-Number Generation, Random-Variate Generation, Simulation Software.

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**UNIT V**

Input Modeling, Verification and validation of Simulation Models, Output Analysis for a Single Model, Comparison and Evaluation of Alternative System Designs, Simulation of Computer Systems.

**Text Book:**

1. Introduction to Operations Research; Frederick S Hillier, and Gerald J Lieberman, 7<sup>th</sup> Edition, Tata McGraw-Hill, 2001 (Chapters 17 and 18 for Unit III)
2. Discrete – Event System Simulation, 3<sup>rd</sup> Edition Pearson Education Asia, 2001 (Chapters 1, 3, 4, 7 and 8 for Unit IV; Chapters 9, 10, 11, 12 and 14 for Unit V) Jerry Banks, John S Carson II, Barry L. Nelson, and David M. Nicol,
3. Operations research – An Introduction, 6<sup>th</sup> Edition, Prentice-Hall of India, 1999 (chapter 1 to 5 for Unit I and Chapters 11 and 16 for Unit II, Section 6.7 for Unit IV)

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**I VI Year B.Tech I Semester**

**4-0-4 CS4127**

**(ELECTIVE-I) FAULT TOLERANT SYSTEMS**

**UNIT-I**

**Basic Concepts:**

Failure and Faults, reliability and failure rate, relation between eligibility and Mean-time – Between failures, maintainability and availability, reliability of series and parallel systems, Modeling of faults, stuck at, Bridging (short-circuit), stuck open, transient and intermittent faults.

**Test Generation:**

Fault diagnosis of digital systems, Test generation for combinational logic circuits – conventional methods, Random testing, transition count testing and signature analysis.

**UNIT-II**

**Fault Tolerant Design:**

Basic concepts – static, dynamic, Hybrid, and self-purging redundancy, shift-over Modular Redundancy (SMR). Triple Modular redundancy, SMR.

Reconfiguration, use of error correcting codes. Time redundancy, software redundancy, fail soft-operation, examples of practical fault tolerant systems, Introduction to fault Tolerant Design of VLSI Chips.

**UNIT III**

**Self Checking Circuits:**

Design of Totally self-checking checkers, checkers using m-out of –n codes, Berger codes and low cost residue code. Self-checking sequential Machines, partially self checking circuits.

**Fail Safe Design:**

Strongly fault secure circuits, failsafe Design of sequential circuits using partition theory and Berger codes, totally self-checking PLA design.

**UNIT-IV**

**Design for Testable Combination Logic circuits:**

Basic concepts of test ability, controllability and observability. The read-muller expansion technique, three level OR-AND-OR design, use of control logic and syndrome-testable design.

**UNIT-V**

Design of Testable Sequential circuits The scan-path technique – level sensitive scan design (LSSD) and Random Access scan technique, built-in-test, built-in-test of VLSI chips, design for autonomous self-Test, Designing Testability into logic Boards.

**TEXT BOOKS:**

1. Fault Tolerant and Fault Testable Hardware design Parag K. Lala PHI 1985.

**REFERENCE BOOKS:**

1. Digital systems design using PLD's LALA, PHI 1990.
2. Logic Design theory, N. N. Biswas, PHI 1990.

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**(ELECTIVE II) DATA MINING AND DATA WAREHOUSING**

**UNIT-I:**

Introduction – Data warehouse delivery method – system process – typical process flow within a data ware house – query management process – process architecture – meta data – data marting.

**UNIT-II:**

Design aspects – Designing dimension tables – Designing starflake scheme – Multi dimensional scheme – partitioning strategy, aggregator – Data marting META DATA – System Data warehouse, process – load manager.

**UNIT-III:**

Hardware and operational design – server hardware, network hardware – parallel technology – security input on design of Hardware – backup and recovery – Service level management – Operating the datawarehouse.

**UNIT-IV:**

Capacity planning – Estimating the load – Timing the data warehouse – Assessing performance – Taking the data load and queries – Testing data warehouse – Development of test plan – Testing the data base and operational environment. Decision Trees, Tree construction, Best split, indices for split, criteria for splitting, construction, algorithms, pruning techniques and algorithms.

**UNIT V:**

Web mining, context, structure and usage minings, Text mining, hierarchy of clustering, text clustering. Temporal and spatial data mining, Association rules, sequence mining, asp, SPADE, SPIRIT, WVM algorithms, episode discovery, event prediction problem, time series, spatial mining, tasks, clustering, trends.

**TEXT BOOKS:**

- 1) Data Warehousing in the real world – Sam Anabory & Dennis Murray – Addison – Wesley, 1997.
- 2) Data Mining Techniques, A. K. Pujari, University Press, 2001, (Chapters 6,7 and 8).

**REFERENCE BOOKS:**

- 1) Data Warehousing in the real world, San Anohory , Bennis Murray, Pearson Education.

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4-0-4 CS4129

**(Elective II) HUMAN COMPUTER INTERACTION**

**UNIT I**

Human Factors of Interactive Software; Theories, Principles and Guidelines; Managing Design

Processes.

**UNIT II**

Expert Reviews, Usability Testing, Surveys and Continuing Assessments; Software Tools; Direct Manipulation and Virtual Environments.

**UNIT III**

Menu Selection, Form Fill-in, and Dialog Boxes; Command and Natural Languages; Interaction Devices.

**UNIT IV**

Response Time and Display Rate; Presentation Styles: Balancing Function and Fashion; Printed Manuals, Online Help, and Tutorials; Multiple-Window Strategies.

**UNIT V**

Computer –Supported Cooperative Work; Information Search and Visualization; Hypermedia and World Wide Web.

**Text Book:**

Designing the User Interface, Ben Shneiderman, 3<sup>rd</sup> Edition, Addison-Wesley, 1998

**REFERENCE BOOKS:**

1. Human-Computer Interaction in the New Millennium, John M. Carroll, First Indian Reprint, Pearson Education Asia, 2002.
2. Human Computer Interaction: Psychology, Task Analysis and Software Engineering, P Johnson, McGraw Hill Book Company, 1992.
3. The Essential Guide to User Interface Design:, An Introduction to GUI Design Principles and Techniques, Wilbert O. Galitz,Second Edition, John Wiley, 2002.

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IV Year B.Tech I Semester                    4-0-4    CS4130

(ELECTIVE-II) DIGITAL SPEECH AND IMAGE PROCESSING

**UNIT-I**

The image model and image acquisition image shape, sampling, intensify images, color images, range images, image capture, scanners, satellite imagery.

**UNIT-II**

Statistical and spatial operations Grey Level transformations, histogram equalization, multi image operations.

Spatially dependent transformations, templates and convolution window operations, Directional smoothing, other smoothing techniques.

**UNIT-III**

Segmentation and Edge detection region operations, Basic edge detection, second order detection, crack edge detection edge following, gradient operators, compass & laplace operators.

**UNIT-IV**

Morphological and other area operations, basic morphological operations, opening and closing operations, area operations morphological transforms.

**UNIT-V**

Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression.

**TEXT BOOKS:**

1. Andriod Low-Introductory computer Vision and Image Processing  
McGraw Hill International Edition.
2. Digital Image Processing, Rafael C. Gonzalez, Richard E. Woods.  
Pearson education.
3. Speech and Language Processing, Daniel Jurafsky and  
James H. Martin, Person Education.

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**MULTIMEDIA AND WEB DESIGN LAB**

Note: The student is advised to refer the prescribed textbook for detailed description of the exercises and hints.

- 1) Mark up a chosen text. Learn to use an image(.gif file). Learn how to create a link.(ex 3.4.3.5,3.8,3.9)
- 2) Write a web page that displays grades of a student.(similar to ex 4.6).
- 3) Practice paint shop pro and create a new title image to your web page. ( ex 5.3)
- 4) Get used to MS frontpage .
- 5) Write Java Script that that inputs three integers from the user and outputs their sum ,average , largest . use alert dialog box to display results.
- 6) Write a script that reads three nonzero values entered by the user in prompt dialos and determine whether they could represent the sides of a triangle.(ex 9.29)
- 7) Write a script for a small retail shop.(ex10.13 pp 331)
- 8) Write a function that determines for a pair of integers whether the second integer is a multiple of the first.(ex 11.5 pp 381)
- 9) Write a script for selection sort.(ex 12.29 pp 437)
- 10) Write a script to write word equivalent of a check amount. ( ex. 13.25 pp 481)
- 11) Practice writing css rules.(ex 14.4 to 14.9 pp 515)
- 12) Use the screen object to get the users screen , then use information to place an image in the middle of the page.

- 13) Write a function that responds to a click anywhere on the page.(ex 16.4 pp 561)
- 14) Write a script that blurs images and slowly un-blurs them when they are fully loaded. (ex.17.5 pp 601)
- 15) Use scripting to draw a series of 8 concentric circles (ex 19.7 pp 644)
- 16) Use path control to simulate the motion of text inside a MARQUEE tag (ex 20.4 pp 664)
- 17) Write an animated version of towers of hanoi.(ex 12.4)
- 18) Implement a digital clock in a web page.(ex 12.15 pp 708).
- 19) Create an on line product catalogue. (ex 21.23 pp708).
- 20) Study and implement updating a remote database. chapter 25)

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**IV Year B.Tech I Semester**

**0-3-2 CS4132**

**COMPUTER NETWORKS LAB**

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 duViatance 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 Decrpt the same

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IV Year B.Tech II Semester

4-0-4 CS4221

**(Elective III) EMBEDDED SYSTEMS**

**UNIT I:**

An Overview of Embedded Software, Applications of Embedded Systems, Hardware Architectures for Embedded Systems, Developing for Embedded Systems, Embedded Software Development Environments. Hardware Fundamentals for the Software Engineer: Terminology, Gates, Timing Diagrams and Memory.

**UNIT II:**

Advanced Hardware Fundamentals, Microprocessors, Buses, Direct Memory Access, Interrupts, Other Common Ports, Conventions Used in Schematics. Interrupts, Microprocessor Architecture, Interrupt Basics, The Shared-Data Problem, Interrupt Latency.

**UNIT III:**

Operating System Basics, Round-Robin, Round-Robin with Interrupts, Function-Queue-Scheduling Architecture, Real-Time Operating System Architecture. Introduction to Real-Time Operating Systems, Tasks and Task States, Tasks and Data, Semaphores and Shared Data.

**UNIT IV:**

More Operating System Services, Message Queues, Mailboxes, and Pipes, Time Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment, Basic Design Using a Real-Time Operating System, Encapsulating Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory Space and Power.

**UNIT V:**

Embedded Software Development Tools, Host and Target Machines, Linker/Loaders for Embedded Software, Getting Embedded Software into the Target System, Debugging Techniques, Testing on Your Host Machine, Instruction Set Simulators, Using Laboratory Tools, Serial Communication Programming.

**UNIT VI:**

Case study: Embedded Database Applications, Networked Java-Enabled Information Appliances, Mobile Java Applications, Software Development in Windows XP Embedded.

**TEXT BOOKS:**

1. An Embedded Software Primer by David E. Simon, Pearson Education.
2. Programming for Embedded Systems by Dreamtech Software Team, Wiley Publishing Inc.

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IV Year B.Tech II Semester

4-0-4 CS4222

**(Elective III) SOFTWARE PROJECT MANAGEMENT**

**UNIT-I**

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation. Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections. The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

**UNIT-II**

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

**UNIT-III**

Model based software architectures: A Management perspective and technical perspective. Work Flows of the process: Software process workflows, iteration workflows, checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

**UNIT-IV**

Project Organizations and Responsibilities : Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation Building blocks, The Project Environment. Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminants.

**UNIT-V**

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

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

**TEXT BOOKS:**

1. Software Project Management, Walker Rayce, dison Wesley, 1998.

**REFERENCES:**

1. Software Engineering Project Management, Richard H.Thayer, IEEE Computer Society, 1997.
2. Software Project Management, S. A. Kelkar, PHI.

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**IV Year B.Tech II Semester**

**4-0-4 CS4223**

**(Elective III) NATURAL LANGUAGE PROCESSING**

**UNIT I:****INTRODUCTION:**

The issues and difficulties in natural language processing – Linguistics and computational linguistics language understanding and generation understanding of spoken, written and textual information.

**UNIT II:****SYNTACTIC PARSING:**

English grammar – Structure of the sentence – Words and Organization of lexicon – Context free and context sensitive grammar – Transformational grammar – The role of syntax analysis in semantics – Definition clause grammar and WASP parsers.

**UNIT III:****SEMANTIC INTERPRETATION:**

The conceptual dependency model for semantic representation – Semantic networks – Frames and scripts – Semantic in lexicon.

**UNIT IV:****DISCOURSE INTERPRETATION:**

The interconnections between pragmatics – pragmatics in discourse analysis – Speech acts – Plan based theory of speech acts – Analyzing intention in Utterances – The representation & use of focus in understanding discourse focusing in comprehension of anaphora.

**UNIT V:****GENERATION:**

Strategies for generation – Planning English referring expressions – KING –  
A natural language generation systems.

**TYPICAL SYSTEMS**

ELIZA – Baseball – GUS – PARRY – LADDER SOPHIE & POET current  
trends in NLP.

**TEXT BOOKS:**

1. Natural Language Understanding, James Allen., Addison Wesley, 1994.
2. Readings In Natural Language Processing, Gross, Jones, Webber.,  
Morgan Kanfamann Publishers, 1986.
3. Speech and Language Processing, Daniel Jurafsky and James H. Mrtin  
Pearson Education

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD****(Elective III) PARALLEL PROGRAMMING****UNIT I:**

Processors and Processors, Shared memory, Fork – Join constructs. Basic  
parallel programming techniques – Loop splitting, ideal speed up, spin locks,  
contention and self scheduling.

**UNIT II:**

Barriers and race conditions – Barrier calls, expression splitting. Variations  
on Loops splitting, self scheduling, indirect scheduling.

**UNIT III:**

Data dependency – forward and backward, Block scheduling. Linear recurrence  
relations, backward dependency performance Tuning – Parallel pro-  
gramming and the structure of programs, over head with number of proces-  
sors, effective use of cache.

**UNIT IV:**

Parallel programming examples – Average, mean squared deviation, fitting  
a line to points, numerical integration, travelling salesman problem, Gaussian  
elimination, Discrete event, Discrete time simulation.

**UNIT V:**

Parallel programming constructs in EPF – Fortran 77. Parallel programming  
under UNIX.

**Text Book:**

1. Introduction to Parallel Programming, Steven Brawer, Academic 1989.

**Reference:**

1. Parallel Programming, Techniques and applications using Networked  
workstations and parallel computers, Barry Wilkinson, Michael Allen,  
Pearson Education.
2. Practical Parallel programming, Gregory V. Wilson, PHI.
3. Parallel Computers Architecture and Programming, V. Rajaraman, C.  
Siva Ram Murty, PHI.

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**IV Year B.Tech II Semester**

**4-0-4 CS4225**

**(Elective IV) CELLULAR AND MOBILE COMMUNICATIONS**

**UNIT I:**

**Introduction to Cellular Mobile Systems:**

A basic cellular system, performance criteria, Uniqueness of Mobile Radio Environment, Operation of cellular systems, planning and cellular systems, analog & cellular systems.

**Elements of Cellular Radio Systems Design:**

General description of the problem, concept of Frequency channels, co-channel Interference Reduction Factor, desired C/I from a normal case in an Omni directional antenna System, cell Splitting, consideration of the components of cellular systems.

**UNIT II**

**Interference:**

Introduction to co-channel interference, real time co-channel interference measurement, design of antenna system, antenna parameters and their effects, diversity receiver non co-channel interference- different types.

**UNIT III:**

**Cell Coverage for Signal and Traffic:**

General Introduction, obtaining the Mobile point-to-point mode propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point-to-point predication model – characteristics, cell site, antenna heights and signal coverage cells, mobile – to mobile propagation.

**UNIT IV:**

**Cell Site Antennas and Mobile Antennas:**

Characteristics, Antennas at Cell site, Mobile Antennas.

**Frequency Measurement and Channel Assignment:**

Frequency Management, Fixed channels assignment, Non-fixed channel assignment, traffic and channel assignment.

**UNIT V:**

**Hand-Off, Dropped Calls:**

Why hand-off, types of hand off and their characteristics, dropped call rates and their evaluation.

**Operational Techniques:**

Parameters, Coverage hole filler, leaky feeders, cell splitting and small cells, narrow beam concept.

**References:**

1. Cellular and Mobile Communications by Lee, Mc Graw Hill.
2. Wireless Digital Communication by Dr. Kamilo Faher (PHI).

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**IV Year B.Tech II Semester**

**4-0-4 CS4226**

**(Elective IV) ROBOTICS**

**UNIT I**

Introduction evaluation of robots and robotics, classification of robots, robot anatomy, characteristics of human arm, design and control issues; manipulation and control; sessions used in robot, robot programming languages-characteristics of task level and robot level languages.

**UNIT – II**

Rotation matrices, Euler angle and RPY representation, homogeneous transformation matrices, Demerit Huntenburg notation, direct and inverse kinematics for common types of robots for position and orientation

**UNIT – III**

Manipulator differential motion and statics; linear and angular velocity of a rigid body, transformation matrix and angular velocity; velocity propagation along links; manipular Jacobian , Jacobian inverse, Jacobian singularities, Lagranzian mechanics, Lagranzian –Eular formulation of control of joints through computed torques.

**UNIT – IV**

Control of manipulation: open and closed loop control, manipulation control problem, force control strategies, hybrid position/ force control; impedance force/torque control;

Robot vision: techniques of robotics vision; image acquisition and processing.

**UNIT – V**

Industrial application: mechanical, hydraulic and pneumatic grippers, dc and ac servomotors, position measuring transducers, optical encoders.

Industrial application: robots in material handling; loading and unloading, robots used in painting; robots in hazardous areas; specification of degrees of freedom in various applications.

**Text books:**

1. Robot dynamics and control, Spong and Vidyasagar,John Wiley and sons, 1990.
2. Robotics – control, sensing, vision and intelligence, Fu K.S., Gonzalez R.C. and Lee C.S.G.; Mc Graw Hill International 1987.
3. Robotics and control, R.K. Mithal, I.J. Nagrath; McGraw International 2001.

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4-0-4 CS4227

(ELECTIVE IV) DECISION SUPPORT SYSTEMS

**UNIT I:**

Introduction to Decision Support Systems (DSS); Human Decision –Making Processes; and Systems, Information Quality and Models.

**UNIT II:**

Types of Decision Support Systems; DSS Architecture, Hardware and Operating System Platforms; DSS Software Tools.

**UNIT III:**

Building and Implementing DSS; Models in DSS; and Mathematical Models and Optimization.

**UNIT IV:**

Group DSS; Expert Systems; and Data Warehousing and Executive Information System Fundamentals.

**UNIT V:**

The Data Warehouse Database; Analyzing the contents of the Data Warehouse; Constructing a Data Warehouse System; and Pulling it all together: Systems Integration and The Future of DSS.

**Text Books:**

Decision Support and Data Warehouse Systems, Efrem G.Mallach, McGraw-Hill, 2000.

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IV Year B.Tech II Semester

4-0-4 CS4228

(ELECTIVE IV) NEURAL NETWORKS

**UNIT I:**

Introduction and Fundamentals of Artificial Neural Networks:  
Biological prototype, Artificial Neuron, Single Layer Artificial Neural Networks, Multilayer Artificial neural Networks, training of Artificial Neural Networks.

**UNIT II :**

Perceptrons :

Perceptrons Representation, perceptron learning, perceptron training Algorithm.

Back Propagation:

Introduction to Back Propagations and Back– Propagation Training Algorithm, Counter Propagation Networks.

**UNIT III:**

Kohonen Self organizing Networks: Introduction, The Kohonen Algorithm, Weight Training, Grossberg Layer, Training the Grossberg Layer.

**UNIT IV:**

Hopfiled Networks: Introduction, The Hopfiled Model, Hopfiled Network, Algorithm, Boltzmann's machine Applications of Hopfiled Networks, Associative Memories, Bidirectional Associative Memories.

**UNIT V:**

Adaptive Resonance Theory: Architecture of Adaptive Resonance Theory, Algorithm, Applicability of Artificial Neural Networks to Pattern Recognition and Image Processing, Dimensionality of Neural Networks of pattern Recognition.

**TEXT BOOKS:**

1. Neural Computing: Theory and Practice – Waserman.
2. An Introduction to Neural Computing - I. Alexander and Helen Marton – William Jackson.

THE END-