

**ACADEMIC REGULATIONS  
COURSE STRUCTURE  
AND  
DETAILED SYLLABUS**

**ELECTRONICS AND  
COMPUTER 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 I 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 / I 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.Tecn. 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**

**I Year B.Tech ECM**

**ELECTRONICS AND COMPUTER ENGINEERING  
COURSE STRUCTURE**

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)

CODE	SUBJECT	T	P	C
ECM1021	English	3	-	6
ECM1022	Mathematics – I	3+1*	-	6
ECM1023	Solid State Physics	2+1*	-	4
ECM1024	Information Technology & Numerical Methods	3	-	6
ECM1025	C & Data Structures	3	-	6
ECM1026	Network Theory	3	-	6
ECM1027	Electronic Devices & Circuits	3	-	6
ECM1028	Engineering Drawing Practice	-	3	4
ECM1029	Computer Programming Lab.	-	6	8
ECM1030	Electronic Devices & Circuits Lab.	-	3	4
		20+2*	12	56

(\* TUTORIAL)

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

2002 – 2003

**II Year B.Tech ECM I Semester**

**ELECTRONICS AND COMPUTER ENGINEERING  
COURSE STRUCTURE**

<b>CODE</b>	<b>SUBJECT</b>	<b>T</b>	<b>P</b>	<b>C</b>
ECM2121	Mathematics-II	4	-	4
ECM2122	Managerial Economics and Financial Analysis	4	-	4
ECM2123	Pulse and Digital Circuits	4	-	4
ECM2124	Signals and Modulation Theory	4	-	4
ECM2125	Switching Theory and Logic Design	4	-	4
ECM2126	Discrete Structures and Graph Theory	4	-	4
ECM2127	Pulse and Digital Circuits Lab	-	3	2
ECM2128	Networks and Modulation Techniques Lab	-	3	2
		<b>24</b>	<b>6</b>	<b>28</b>

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

**II Year B.Tech ECM II Semester**

**ELECTRONICS AND COMPUTER ENGINEERING  
COURSE STRUCTURE**

<b>CODE</b>	<b>SUBJECT</b>	<b>T</b>	<b>P</b>	<b>C</b>
ECM2221	Probability & Statistics	4	-	4
ECM2222	Electrical Technology	4	-	4
ECM2223	Linear and Digital IC Applications	4	-	4
ECM2224	Data Communications	4	-	4
ECM2225	Computer Organization	4	-	4
ECM2226	Object Oriented Programming	4	-	4
ECM2227	IC Applications Lab	-	3	2
ECM2228	OOPS Lab through JAVA	-	3	2
		<b>24</b>	<b>6</b>	<b>28</b>

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

III Year B.Tech ECM I Semester

**ELECTRONICS AND COMPUTER ENGINEERING****COURSE STRUCTURE**

CODE	SUBJECT	T	P	C	
ECM3121	Advanced Computer Architecture	4	-	4	
ECM3122	Digital Signal Processing	4	-	4	
ECM3123	Digital System Design	4	-	4	
ECM3124	Microprocessors and interfacing	4	-	4	
ECM3125	Operating Systems and Systems Programming	4	-	4	
ECM3126	Computer Graphics	4	-	4	
ECM3127	Microprocessors Lab	-	3	2	
ECM3128	Operating Systems and Systems Programming Lab	-	3	2	
<b>24</b>		<b>6</b>		<b>28</b>	

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

III Year B.Tech ECM II Semester

**ELECTRONICS AND COMPUTER ENGINEERING****COURSE STRUCTURE**

CODE	SUBJECT	T	P	C	
ECM3221	Management Science	4	-	4	
ECM3222	Database Management Systems	4	-	4	
ECM3223	Visual Programming Techniques	4	-	4	
ECM3224	Computer Networks	4	-	4	
ECM3225	Software Engineering	4	-	4	
ECM3226	Artificial Intelligence	4	-	4	
ECM3227	Database Management Systems Lab	-	3	2	
ECM3228	Visual Programming Techniques Lab	-	3	2	
<b>24</b>		<b>6</b>		<b>28</b>	

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

IV Year B.Tech ECM I Semester

**ELECTRONICS AND COMPUTER ENGINEERING****COURSE STRUCTURE**

CODE	SUBJECT	T	P	C
ECM4121	VLSI Systems Design	4	0	4
ECM4122	Mathematical Modelling and Simulation	4	0	4
ECM4123	Advanced Computer Architecture	4	0	4
ECM4124	Internet and Java	4	0	4
<b>Elective-I:</b>		4	0	4
ECM4125	Speech and Image Processing			
ECM4126	Distributed Systems			
<b>Elective-II:</b>		4	0	4
ECM4127	Real Time Systems			
ECM4128	Fault Tolerant Systems			
ECM4129	Electronic Computer Aided Design Lab.	-	3	2
ECM4130	Internet and Java Lab	-	3	2
		<b>24</b>	<b>6</b>	<b>28</b>

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

IV Year B.Tech ECM II Semester

**ELECTRONICS AND COMPUTER ENGINEERING****COURSE STRUCTURE**

CODE	SUBJECT	T	P	C
	<b>Elective-III:</b>	4	0	4
ECM 4221	Neural Networks			
ECM 4222	Multimedia Systems			
	<b>Elective-IV:</b>	4	0	4
ECM4223	Cellular and Mobile Communications			
ECM4224	Satellite Communications			
ECM4225	Project work	-	-	8
		<b>8</b>	<b>-</b>	<b>16</b>

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HYDERABAD**

**I Year B.Tech ECM**

**3–0–6 ECM1021**

**ENGLISH**

(Common for All Branches)

The following textbooks 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 Trailblazers 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 Textbook of English for Engineers and Technologists, OL).
2. S.S. Bhattacharya (a profile from The Institution Builders in Masterminds, OL).

**UNIT – IV:**

1. Environment, Unit 1: Pollution (from A Textbook 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 Textbook 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 be 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 Mason (OL).
4. English for Professional Students, by S.S.Prabhakara Rao.
5. TOEFL (ARCO & BARRONS, USA) and Cliff's TOEFL.
6. GRE (ARCO & BARRONS, USA) and Cliff's GRE.
7. Communication Skills for Technical Students, by T.M.Farhatullah (OL).
8. Strategies for Engineering Communication – by Susan Stevenson and Steve Whitmore, John Wiley and Sons.
9. Basic Communication Skills for Technology – by Andrea J. Rutherford, 2/e, Pearson Education Asia.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**I Year B.Tech ECM**

**3–0–6 ECM1022**

**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 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.

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**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. Narsimulu, 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. Greenberg, 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.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD

I Year B.Tech ECM

2–0–4 ECM1023

SOLID STATE PHYSICS

(Common for EEE, ECE, EIE, EConE, ICE, CSE, IT, 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.

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

Introduction – Electronic, Ionic and Orientation polarization – Internal field – Clausius Mosotti equation – Ferro and Piezo 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).

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD

I Year B.Tech ECM

3–0–6 ECM1024

**INFORMATION TECHNOLOGY & NUMERICAL METHODS**

(Common for EEE, ECE, EIE, EContE, ICE, CSE, IT, CSSE, ETM, ECM, BME)

**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.

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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 BOOKS:**

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

**REFERENCES:**

1. Using information technology – a practical introduction to computers and communication – by Williams, Sawyer and Hutchins, Tata McGraw Hill, 2000
2. Computers and common sense – by Shelly and Hunt; Prentice Hall of India
3. Fundamentals of Information Technology – by Alexis Leon, Mathews Leon, Leon Press and Vikas Publishing House.
4. Using Information Technology: A Practical Introduction to Computers & communications – by Brian Williams, Stacey Sawyer, and Sarah Hutchinson, Tata McGraw-Hill, 3<sup>rd</sup> Edition, 2001, ISBN: 0-07-043562-6.
5. Upgrading and Repairing PCs – by Scott Mueller, Pearson Education Asia, 13th Edition, 2002, ISBN: 81-7808-552-6.
6. Trouble Shooting, Maintaining & Repairing PCs – by Stephen J. Bigelow, Tata McGraw-Hill Publishing Company, 5<sup>th</sup> Edition, 2001, ISBN: 0-07-047367-6.
7. Introduction to Information Technology – by 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 ECM

3–0–6 ECM1025

**C & DATA STRUCTURES**

(Common for EEE, ECE, EIE, EContE, ICE, CSE, IT, CSSE, ETM, ECM, BME)

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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

I Year B.Tech ECM

3-0-6 ECM1026

**NETWORK THEORY**

(Common for EEE, ECE, EIE, EContE, ICE, CSE, IT, 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,  $\Delta$ , 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:**

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

**REFERENCES:**

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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

I Year B.Tech ECM

3–0–6 ECM1027

**ELECTRONIC DEVICES & CIRCUITS**

(Common for EEE, ECE, EIE, EContE, ICE, CSE, IT, CSSE, ETM, ECM, BME)

**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**

I Year B.Tech ECM

0-3-4 ECM1028

**ENGINEERING DRAWING PRACTICE**

(Common for EEE, ECE, EIE, EContE, ICE, CSE, IT, 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**

I Year B.Tech ECM

0-6-8 ECM1029

**COMPUTER PROGRAMMING LAB**

(Common for EEE, ECE, EIE, EContE, ICE, CSE, IT, CSSE, ETM, ECM, BME)

1. Write a C program that evaluates the following algebraic expressions after reading necessary values from the user:  
 a)  $ax+b/ax-b$   
 b)  $2.5 \log x + \cos 32^{\circ} + 1x^2 - y^2 | + \sqrt{2xy}$   
 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 =  $ut + 1/2at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>). Write C program to find the distance 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
3	3	3
4	4	4
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 ECM

0–3–4 ECM1030

**ELECTRONIC DEVICES & CIRCUITS LAB**

(Common for EEE, ECE, EIE, EConE, ICE, CSE, IT, 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**

**I Year B.Tech ECM I Semester**

**4–0–4 ECM2121**

**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 – Diagnolization 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 ECM - I Semester**

**4-0-4 ECM2122**

**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 economics 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 Management Y.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.

### PULSE & DIGITAL CIRCUITS

(Common for ECE, EEE, EIE, EcontE, ECM)

#### UNIT – I: LINEAR WAVE SHAPING:

High pass and low pass RC circuits and their responses for sinusoidal, step voltage, pulse, square wave and ramp inputs. High pass RC network as a differentiator. Low pass RC network as an integrator. Attenuators and their applications in CRO probe. RL and RLC circuits and their response for step input, Ringing circuits.

#### UNIT – II: NON-LINEAR WAVE SHAPING:

Diode clippers, Transistor clippers, clipping at two independent levels, Emitter coupled clipper, Diode comparators, Diode differentiator. Comparator, Applications of voltage comparators, Clamping operation, clamping circuits using Diodes with different inputs, Clamping circuit theorem, Practical clamping circuits, Effect of Diode characteristics on clamping voltage.

#### SWITCHING CHARACTERISTICS OF DEVICES:

Diode as a switch, piecewise linear Diode characteristics, Transistor as a switch, breakdown voltage consideration of transistors, saturation parameters of transistors and their variation with temperature. Design of a transistor switch, Transistor switching times.

#### UNIT – III: MULTIVIBRATORS:

Bistable, Monostable and Astable multivibrators using Transistors, Schmitt trigger.

#### UNIT – IV: SWEEP CIRCUITS:

Voltage sweeps, methods of linearization, Bootstrap and Miller circuits, Linear current sweep, application in T.V., synchronization.

#### SYNCHRONISATION AND FREQUENCY DIVISION:

Principles of Synchronization, Synchronization of Astable multivibrators – Phase Delay and Pulse jitters – Synchronization of sweep circuits with Symmetrical signals.

#### UNIT – V: GATES:

Unidirectional and Bi-directional Sampling gates.

#### BLOCKING OSCILLATORS:

Base timing, Emitter timing, Astable blocking Oscillator.

#### TEXT BOOKS:

1. Pulse, Digital and Switching Waveforms – Millman & Taub, McGraw-Hill Publ.

#### REFERENCES:

1. Wave Generation and Shaping – by L. Strauss.
2. Pulse, Digital Circuits and Computer Fundamentals – by R. Venkataraman.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

**II Year B.Tech ECM - I Semester                    4-0-4    ECM2124**

**SIGNALS AND MODULATION THEORY**

**UNIT-I:**

**Signal Analysis:**

Analogy between Vectors and signals, orthogonal vector and signal spaces, Approximation of a function by a set of mutually orthogonal functions, evaluation of mean square error, closed or complete set of orthogonal functions, orthogonality in complex functions, trigonometric and exponential Fourier series, representation of periodic function by Fourier series, complex Fourier spectrum, representation of arbitrary function, concept of Fourier Transform (ET.), ET. of simple functions, concept of Impulse function, ET. involving impulse functions, properties of Fourier Transforms, concept of convolution in time domain and frequency domain, graphical representation of convolution, Sampling theorem and its proof, effect of under sampling.

**UNIT – II:**

**Correlation of Signals & Signal Transmission through a system**

Cross correlation and auto correlation of functions, properties of correlation function. Energy density spectrum, Parsevals, Theorem, Power density spectrum, relation between auto correlation function and energy / power spectral density function, Linear system, impulse response of a linear system, Linear time invariant (LTI) and Linear time variant (LTV) systems, Transfer function of LTI system, filter characteristics of Linear systems, Distortionless transmission through a system, signal bandwidth, system bandwidth, Ideal, LPF, HPF and BPF characteristics, causality and physical realisation - relationship between bandwidth and rise time.

**UNIT – III:**

Analog Modulation Techniques Concept of Modulation, Need of Modulation, Frequency translation, Amplitude modulation, spectrum of A.M. Power content, DSB, SSB and VSB. Demodulation techniques for AM, DSB, SSB & VSB. Frequency and phase modulation, spectrum of NBFM and WBFM, Generation of WBFM-Armstrong Method, Carson's rule for estimation of bandwidth, Demodulation techniques for FM-Center tuned discriminator and Ratio detectors, FDM.

**UNIT – IV:**

**Pulse & Digital Modulation Technique:**

PAM Natural and Flat top sampling, pulse time modulation, Channel bandwidth for PAM Signal, Pulse code Modulation, Quantization of Signals, quantisation error, U-law and A-Law Companders, Delta modulation, (DM), DPCM, Adaptive DM, Synchronous and Asynchronous time division multiplexing.

**UNIT – V:**

**Digital Carrier Modulation & Line Coding Techniques.**

Introduction optimum receiver for binary digital modulation schemes, Binary ASK, FSK PSK, DPSK introduction to M-ary schemes - QPSK QAM, MSK line coding techniques - Elementary Treatment & comparison study of NRZ, RZ, Manchester, bipolar, high density dipolar signalling schemes (ON - OFF)

**TEXT BOOKS:**

1. B.P Lathi, vistley - Communication systems, Eastern Ltd., (for Units I & II)
2. B.P. Lathi – Modern Digital & Analog Communication Systems, Ox. University, 1986, 2<sup>nd</sup> Edn. (For Units I & II)
3. A.V. Oppenheim, A.S. Wilksy - Signals and Systems, and IT Young, (For Units III, IV & V)
4. Taub & Schillong - Principle of Communication Systems (TMH)
5. A.B. Carlson, MC Graw Hills, Communication Systems.

**REFERENCE:**

1. B.P Lathi, Signals & Systems.
2. Simon Haykin, Communication Systems
3. Simon Haykin, Analog and Digital Communication.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

**II Year B.Tech ECM - I Semester**

**4–0–4 ECM2125**

**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, Bready 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 ECM - I Semester

4–0–4 ECM2126

**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.

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HYDERABAD

II Year B.Tech ECM - I Semester

0–3–2 ECM2127

**PULSE AND DIGITAL CIRCUITS LAB.**

(Common for ECE, EIE, EcontE, ECM)

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates & some applications.
6. Study of Flip-Flops & some applications.
7. Sampling Gates.
8. Astable Multivibrator.
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap sweep circuit.

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II Year B.Tech ECM I Semester

0–3–2 ECM2128

**NETWORKS AND MODULATION TECHNIQUES LAB**

**LIST OF EXPERIMENTS:**

1. Verification of Superposition & Max Power Transfer theorems.
2. Verification of Thevenin's Q Norton's theorem.
3. Series & parallel resonance – Timing, Resonant frequency, Bandwidth and Q-factor for RLC network.
4. Two port network parameters.
5. Frequency response of LP and HP Filters
6. Amplitude modulation & Demodulation
7. Frequency modulation & Demodulation
8. Spectral analysis of AM & FM signals using Spectrum Analyser
9. Verification of sampling theorem
10. Design of fibre optic digital link for transmission of digital signals.
11. Pulse code modulation, Delta modulation and Adaptive Delta modulation.
12. Digital carrier modulation techniques (ASK, FSK, PSK)

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I Year B.Tech ECM - II Semester

4–0–4 ECM2221

**PROBABILITY AND STATISTICS**

(Common to CSE, CE, ME & ECM)

**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, -  $c^2$  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 ECM - II Semester**      **4–0–4 ECM2222**

**ELECTRICAL TECHNOLOGY**

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

**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 ECM - II Semester**      **4–0–4 ECM2223**

**LINEAR & DIGITAL IC APPLICATIONS**

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

**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, Multivibrators, 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, tri-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.

**TEXT BOOKS:**

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

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**II Year B.Tech ECM - II Semester**

**4–0–4 ECM2224**

**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.

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**II Year B.Tech ECM - II Semester**

**4–0–4 ECM2225**

**COMPUTER ORGANIZATION**

**UNIT I**

Concept of Von Newmann Machine, components in a computer, functions of various 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 driven 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.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY**  
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II Year B.Tech ECM - II Semester

4-0-4 ECM2226

**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- Multilayer 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)

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**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.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY**  
**HYDERABAD**

**II Year B.Tech ECM II Semester**

**0-3-2 ECM2227**

**IC APPLICATIONS LAB**

**(Common for ECE,EIE,E.Cont.E, Mechatronics,ECM)**  
**(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 ICs.
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 ECM - II Semester**

**0-3-2 ECM2228**

**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 draw Oval , 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)

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
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**III Year B.Tech ECM - I Semester**

**4–0–4 ECM3121**

**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, inter connection 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, multiprocessor 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, Pearson education.

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III Year B.Tech ECM - I Semester

4–0–4 ECM3122

**DIGITAL SIGNAL PROCESSING**

(Common for ECE, EIE, EContE, EEE, BME, ECM)

**UNIT – I:**

Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, causality, Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

**UNIT – II:**

Discrete Fourier series: Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT. Computation of DFT: Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT.

**UNIT – III:**

Applications of z-transforms, solution of difference equations of digital filters. System function, stability criterion, frequency response of stable systems. Realization of digital filters – direct, canonic, cascade and parallel forms.

**UNIT – IV:**

IIR DIGITAL FILTERS: Analog filter approximations – Butterworth and Chebyshev. Design of IIR Digital filters from analog filters, Bilinear transformation method, step and impulse invariance techniques, Spectral transformations.

**UNIT – V:**

FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques. Comparison of IIR & FIR filters.

Applications of FFT in spectral analysis and filtering. Applications of DSP to speech processing and Radar signal processing.

**TEXT BOOKS:**

1. Digital Signal Processing – by A.V. Oppenheim and R.W. Schaffer, PHI.
2. Digital Filter Analysis and Design – by A. Antoniou, TMH.

**REFERENCES:**

1. Digital Signal Processing – by W.D. Stanley et.al. Resin Publ.
2. Digital Signal Processing – by S. Salivahanan et al., TMH.
3. Digital Signal Processing – by Thomas J. Cavicchi, WSE, John Wiley.

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III Year B.Tech ECM - I Semester

4–0–4 ECM3123

**DIGITAL SYSTEM DESIGN****UNIT - I**

Computer Aided Minimization Procedures (CAMP)

CAMP Algorithm, introduction to Cube based Algorithms

**UNIT - II**

Design of Large Scale Digital Systems

ASM chart method, Hardware description language and control sequence method, Design using PLAS, PALS, FPGA, Bubble memories, CCDs and ASICs.

**UNIT – III:**

Fault Classes and models, Fault detection and location experiments, part sensitization and Boolean Difference methods, Kohavi algorithm, Failure Tolerant design. Introduction to Fault - Tolerant VLSI processor arrays.

**UNIT – IV:**

Fault Diagnosis in Sequential Circuits

State identification and Fault detection experiments, Design of diagnosable machines.

**UNIT – V:**

Design for Test Ability

PLA minimization and PLA folding, faults in PLAS, Test generation, DFT Schemes, Built in self test.

**TEXT BOOKS:**

1. Z. Kohavi, Switching and finite Automata Theory (TMH edition)
2. N.N. Biswas, logic design theory (PHI edition)
3. M. Mano, Digital design
4. Schaum's, series Digital design
5. F.J. Hill and Peterson Introduction to switching theory and logical design (John Wiley)

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**III Year B.Tech ECM - I Semester**

**4–0–4 ECM3124**

**MICROPROCESSORS & INTERFACING**

(Common for ECE, EIE, EEE, EContE, BME, Mechatronics, ECM)

**UNIT – I:**

Evolution of Microprocessors, Architecture of 8086, Register set of 8086, Special functions of general purpose registers, Flag register and function of each flag.

Addressing modes of 8086, Instruction set of 8086, Assembler directives, Simple assembly language programming of 8086 involving looping, picking maximum and minimum, sorting, and evaluation of arithmetic expression.

**UNIT – II:**

Pin diagram of 8086, Minimum mode and Maximum mode of operation, Timing diagram, Parallel data transfer schemes, Programmed I/O, Interrupt driven I/O, DMA, 8255 PPI, various modes of operations and interfacing to 8086. A/D, D/A converter interfacing. Simple programs using A/D, D/A converters. Stepper motor interfacing.

Need for serial I/O 8251 USART architecture and programming features, Interfacing to 8086, TTL – to – RS232C, RS232C-to-TTL conversion. Need for DMA, 8237 DMA controller architecture and programming features, Interfacing to 8086.

**UNIT – III:**

Interrupt structure of 8086, Vector Interrupt table, 8259 PICU architecture, Programming features and interfacing, Memory interfacing (static RAM only) – Types of EPROMS & SRAM, 74LS138 decoder, Interfacing EPROMS and SRAMS.

**UNIT – IV:**

8051 Microcontroller Architecture, Register set of 8051, Modes of timer operation, Serial port operation, Interrupt structure of 8051, Memory and I/O interfacing of 8051.

**TEXT BOOKS:**

1. A.K.Ray and K.M Bhurchandi - Advanced Microprocessors & Peripherals, TMH.
2. Douglas V. Hall – Microprocessors & Interfacing, 2<sup>nd</sup> Ed. (TMH).
3. John Uffenbeck - The 8086/8088 Family, PHI.
4. Kenneth J.Ayala - 8051 Microcontroller, (Penram International).

**REFERENCES:**

1. Microcomputer Systems: The 8086/8088 Family Architecture, Programming and Design – by Yu Cheng Liu and Glenn A. Gibson, 2/e, PHI.
2. Microprocessors, Interfacing and Applications – by Ram Singh and B.P. Singh, New Age Publ.

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III Year B.Tech ECM - I Semester

4-0-4 ECM3125

**OPERATING SYSTEMS & SYSTEMS PROGRAMMING**

**UNIT – I**

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-III**

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.

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**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.

## 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 Bresenhams. Bresenhams 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 Beziere 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 levels 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.

2002 – 2003

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
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III/IV Year B.Tech ECM - I Semester

0-3-2 ECM3127

MICROPROCESSORS LAB.

(Common for ECE, EIE, EEE, EContE, BME, ECM)

I. Microprocessor 8086:

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

II. Interfacing:

1. 8259 – Interrupt Controller.
2. 8279 – Keyboard Display.
3. 8255 – PPI.
4. 8251 – USART.

2002 – 2003

III. Microcontroller 8051:

1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.
4. Understanding three memory areas of 00 – FF (Programs using above areas).
5. Using external interrupts.
6. Programs using special instructions like swap, bit/byte, set/reset etc.
7. Programs based on short, page, absolute addressing.

III Year B.Tech ECM - I Semester                    0-3-2    ECM3128

### OPERATING SYSTEMS & SYSTEMS PROGRAMMING LAB

#### Operating Systems Related exercises:

Simulate the following CPU scheduling algorithms

- a) Round Robin    b) SJF                            c) FCFS d) Priority

Simulate all file allocation strategies

- a) Sequential    b) Indexed                        c) Linked

Simulate MVT and MFT

Simulate all File Organization Techniques

- a) Single level directory    b) Two level c) Hierarchical d) DAG

Simulate Bankers Algorithm for Dead Lock Avoidance

Simulate Bankers Algorithm for Dead Lock Prevention

Simulate all page replacement algorithms

- a) FIFO    b) LRU    c) LFU    Etc...

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.

III Year B.Tech ECM - II Semester

4-0-4    ECM3221

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

#### UNIT I:

##### Introduction to Management:

Concepts of Management and Organization – Functions of management – Evolution of Management Thought: Taylors Scientific Management, Fayols Principles of management, Douglas Mc Gregors theory X and Theory Y, Maros 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 , Palacement ,Wage and Salary administration promotion transfer, separation; Performance appraisal , grievance handling and welfare administration , job evaluation and Merit Rating.

**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 Donnel ,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.

**DATABASE MANAGEMENT SYSTEMS****UNIT I**

Introduction to database systems: Overview- File systems Vs 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, Schema 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, IV edition.
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.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
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III Year B.Tech ECM - II Semester

4–0–4 ECM3223

**VISUAL PROGRAMMING TECHNIQUES****UNIT I**

Visual programming Environment: integrated development environment for Visual C++ and Visual Basic components of Visual C++ and Visual Basic.

**UNIT II**

Parts of Visual C++ program, applications object, Main window object, View object document object. Event oriented windows programming device context, Microsoft foundation classes: An overview.

**UNIT III**

Reading keystrokes, Handling mouse, Creating menus, Toolbars, Buttons, Status bar prompts, Dialog box, Check box, Radio buttons, List boxes, Combo boxes, Sliders, Serialization, File handling, Multiple documents.

**UNIT IV**

Understanding and working with objects, Controls, File handling, Debugging.

**UNIT V**

DLLs, OLE Object Technologies, Creating Internet programs using Visual C++ and Visual Basic. Creating Active X controls, connecting to database using visual C++ and Visual Basic.

**SUGGESTED READING:**

1. Steven Holzner, Microsoft Visual C++5, BPB Publications, 1997.
2. Paul Sanna, using Visual basic for Applications, PHI, 1997.
3. Noel Jerke, the Complete reference Visual Basic 6, TMH.

2002 – 2003

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY**  
**HYDERABAD**

**III Year B.Tech ECM - II Semester**      **4-0-4 ECM3224**  
**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, Multimedia.

2002 – 2003

**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.

2002 – 2003

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

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III Year B.Tech ECM - II Semester

4-0-4 ECM3225

### 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 – Effect 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.

2002 – 2003

#### 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 Baharni, Mc Graw Hill.

2002 – 2003

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD

III Year B.Tech ECM - II Semester

4–0–4 ECM3226

**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.

2002 – 2003

**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.

2002 – 2003

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
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III Year B.Tech ECM - II Semester

0-3-2 ECM3227

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.

2002 – 2003

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD

III Year B.Tech ECM - II Semester

0-3-2 ECM3228

VISUAL PROGRAMMING TECHNIQUES LAB

(Exercises to be repeated both in VB and VC++)

1. Design and implement a business and scientific calculator.
2. Design and implement a personal diary
3. Design and implement a pay roll system using some backend database.
4. Design and implement a personal information system use images also to display the photo of a candidate.
5. Design and implement a file browser.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD

IV Year B.Tech ECM - I Semester

4-0-4 ECM4121

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.

2002 – 2003

**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 BOOKS :**

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

**REFERENCES :**

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

2002 – 2003  
**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY**  
HYDERABAD

IV Year B.Tech ECM - I Semester      4-0-4    ECM4122  
**MATHEMATICAL MODELING 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.

2002 – 2003

#### 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.

#### 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, Jerry Banks, John S Carson II, Barry L. Nelson, and David M. Nicol, 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)
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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**IV Year B.Tech ECM - I Semester**

**4–0–4 ECM4123**

**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, inter connection 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.mpp 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, Pearson education.

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HYDERABAD**

III Year B.Tech ECM - I Semester

4–0–4 ECM4124

**INTERNET AND JAVA**

**UNIT I:**

Introduction, The History of Java, Characteristics of Java, Java Development Tools, Java Applications, Anatomy of the Application Program, Java Applets, Anatomy of the Applet Program, Applications versus Applets, Java Building Elements, Identifiers, Variables, Constants, Numerical Data Types, Numeric Literals, Shortcut Operators, Numeric Type Conversion, Character Data Type, Boolean Data Type, Operator Precedence, Programming Errors, Compilation Errors, Programming Style and Documentation, Separate Classes.

**UNIT II:**

Using if Statements, Using Switch Statements, Using Loop Structures, Using the Keywords break and continue. Methods: Creating a Method, Calling a method, Overloading Methods, Creating Methods in Separate Classes, Method Abstraction, Debugging, Recursion, Recursion versus Iteration.

**UNIT III:**

Object Oriented Programming: Objects and Classes, Passing Objects to Methods, Instance Variables and class Variables, Instance Methods and Class Methods, The Scope of Variables, Packages, Java Application Programming Interface, The Math Class, Arrays and Strings: Declaring and Creating Arrays, Initializing and Processing Arrays, Sorting Arrays, Searching Arrays, Array of Objects, Copying Arrays, Multidimensional Arrays, The string class, The String Buffer Class, The String Tokenizer Class, Command-Line Arguments.

**UNIT IV:**

Super classes and sub classes, Using the Keyword Super, the Keyword this, The object class, The Final and abstract Modifiers, Casting Objects, Processing Numeric Values as Objects, the Number class, Processing Date and Time, Interfaces, Class Design Guidelines, Graphics Programming:

Introduction, The abstract Window Toolkit Class Hierarchy, Frames, Event-Driven Programming, Layout Managers, Panels, the repaint(), update() and paint() Methods, Canvases, The Color Class, Drawing Geometric Figures, The Font and FontMetrics Classes, Drawing Lines, Drawing Rectangles, Ovals, Arcs, Polygons.

**UNIT V:**

Exception Handling, Exceptions and Exception Types, Understanding Exception Handling, Rethrowing Exceptions, The finally Clause, Cautions when Using Exceptions. Input and Output: Introduction, Stream classes, InputStream and Reader, OutputStream and Writer, Processing External Files, Array Streams, Filter Streams, Data Streams, Print Streams, Buffered Streams, Parsing Text Files, Random Access Files, Interactive Input and Output, Piped Streams, String streams, Pushback streams, Line number reader and Object Streams. Networking: Client/Server Computing, Serving Multiple Clients, Applet Clients, Viewing Web Pages, Retrieving Files from Web Servers.

**TEXT BOOK:**

1. An Introduction to JAVA Programming, Y. Daniel Liang, PHI.

**REFERENCE:**

1. Beginning JAVA2, JDK 1.3 Version, IVOR Harton, Wrox Publishers.

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HYDERABAD**

IV Year B.Tech ECM - I Semester

4–0–4 ECM4125

**SPEECH AND IMAGE PROCESSING  
(ELECTIVE – I)**

**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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**IV Year ECM – I Semester**

**4 – 0 – 4 ECM4126**

**DISTRIBUTED SYSTEMS  
(ELECTIVE – I)**

**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.

**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

**REAL TIME SYSTEMS**  
**(ELECTIVE – II)**

**UNIT I:**

## Introduction

Definition and Classification of Real time systems: Concept of computer control, sequence, loop and supervisor control, centralized, hierarchical and distributed systems, Human Computer interface, hardware requirement for real time applications, specialized processors, interfaces, communications.

**UNIT II:**

## Real Time Languages:

Special features of languages for real time application, review of data types, concurrency, exception handling, coroutines, low level facilities. Overview of Real time languages, modula 2 and Ada as a Real Time Languages.

Real Time Operating Systems: (PSOS+V<sub>x</sub> WORKS).

Scheduling strategies, priority structures, Task management, Real Time Clock Handler, Code sharing, Resource Control, Intertask Communication and Control, Example of Creating and RTOS based on modula 2 kernel; Practical Real Time Operating Systems.

**UNIT III:**

## Design Aspects:

Introduction to Design of Real Time Systems, Specification, Preliminary Design, multitasking Approach, monitors, Rendezvous.

Development Methodologies: Yourdon, Methodology, Ward and Mellor Method, HATLEY & Pribhai method, MASXOT, PAISLEY System.

**UNIT IV:**

## Design Analysis:

## Introduction:

Petrinets, Analysis of Petri Nets, Scheduling problem Real Time Database, Real Time Vs General Purpose Databases, Transaction priorities and Aborts, Concurrency Control, Disk Scheduling Algorithms, Maintaining Serialization Consistency.

**UNIT V:**

## Fault Tolerance Techniques: Introduction.

Faults, Errors and Failures, Fault types, Detection and Containment, Redundancy, Integrated Failure Handling.

## Reliability Evaluation:

Introduction, Parameters, Reliability Models for Hardware, Software Error Models.

**TEXT BOOKS:**

1. Real Time Computer Control, Stuart Bennett, PHI, 1997.
2. Real Time Systems, Krishna C. M. & Kand Shin G. Mc Graw Hill, 1997, L. R. Rabiner & R. W. Schafer.

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IV Year B.Tech ECM - I Semester

4-0-4 ECM4128

**FAULT TOLERANT SYSTEMS**  
(ELECTIVE – II)

**UNIT-I**

## Basic Concepts:

Failure and Faults, reliability and failure rate, relation between Reliability 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-out 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 testability, Controllability and observability. The Reed-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 PLDs LALA, PHI 1990.
2. Logic Design theory, N. N. Biswas, PHI 1990.

2002 – 2003

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ELECTRONIC COMPUTER AIDED DESIGN LAB

(Common for ECE and ECM)

The following experiments are to be simulated using VHDL and verified experimentally in Digital IC Lab.

1. Gates.
2. D Flip-Flop 7474.
3. Decade counter – 7490.
4. 4 Bit counter – 7493.
5. Shift registers – 7495.
6. Universal shift registers – 74194/195.
7. 3 – 8 Decoder – 74138.
8. 4 Bit Comparator – 7485.
9. 8 x 1 Multiplexer – 74150.
10. 16 x 1 Multiplexer – 74151.
11. RAM (16 x 4) – 74189 (Read and Write operations).
12. Stack and Queue Implementation using RAM.

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0-3-2 ECM4130

INTERNET & JAVA LAB

1. Write a Java applet that prints a box, an oval, an arrow and a diamond using asterisks (\*).
2. Write a Java applet that reads in two integers and determines and prints if the first is a multiple of the second.
3. Write an applet that reads in the size of the side of a square and prints a hollow square of that size out of asterisks.
4. A palindrome is a number or text phrase that reads the same backwards as forwards. Write an applet that reads in a five digit integer and determines whether or not it is a palindrome.
5. Write an applet that reads a non-negative integer and computes and prints its factorial.
6. Write an applet that estimates the value of the mathematical constant.
7. Write an applet that computes the value of  $e^x$ .
8. Write an applet that inputs integers and passes them one at a time to a method – ISEVEN – which uses the modulus operator to determine if an integer is even. The method should take an integer argument and return true if the integer is even and false otherwise.
9. Write a method that takes an integer value and returns the number with its digits reversed. Display the results of the method in the status bar.
10. Write a method quality points that inputs a students average and returns 4 if a students average is 90-100, 3 if the average is 80-89, 2 if the average is 70-79, 1 if the average is 60-69 and 0 if the average is lower than 60. Incorporate the method into an applet that reads a value from the user. Display the result of the method in the status bar.
11. Write a method distance that calculates the distance between two points.  $(x_1, y_1)$  and  $(x_2, y_2)$ . Incorporate this method into an applet that enables the user to enter the co-ordinates of the points.
12. Write an applet that uses a method – circle area – to prompt the user of the radius of a circle and to calculate and print the area of that circle.
13. Write a recursive method – string reverse – that takes a character array containing a string as an argument, prints the string backwards

and returns nothing.

14. 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. The set methods should verify that length and width are each floating point numbers larger than 0.0 and less than 20.0.
15. Write a program and supporting classes with inheritance to get - point, circle and cylinder.
16. Write a program and supporting classes with inheritance to get point, square and cube.
17. Write an applet that uses string method – to compare two strings input by the user. Program should state whether the first string is less than, equal to or greater than the second.
18. Write an applet that inputs text and outputs text in uppercase and lower case letters.
19. Write an applet that records a series of strings and outputs only those strings beginning with the letters "b".
20. Creation of GUI for typical cases.

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**IV Year B.Tech ECM - II Semester**

**4–0–4 ECM4221**

**NEURAL NETWORKS  
(ELECTIVE – III)**

**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 BackPropagations 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:**

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

2002 – 2003

**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.

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**MULTIMEDIA SYSTEMS  
(ELECTIVE – III)**

**UNIT I:**

Applications of multimedia, Delivery of Multimedia, historical Context, Multimedia Production, Terminology, Interactivity, Social and Ethical Considerations, A New Medium, Further Information.

Enabling Technologies: Digital Representations, Hardware Requirements, Software, Networks, Standards, Further Information.

**UNIT II:**

Introduction to Computer Graphics:

Vector Graphics and Bitmapped Graphics, Combining Vectors and Bitmaps, File Formats, Further Information.

Vector Graphics: Fundamentals, Shapes, Transformations and Filters, 3-D Graphics, Further Information.

Bitmapped Images: Resolution, Image Compression, Image Manipulation, Geometrical Transformations, Further Information.

**UNIT III:**

Color:

Color and Science, RGB Color, Other Color models, Channels and Color Correction, Consistent Color Further Information.

Characters and Fonts:

Character Sets, Fonts, Further Information.

Layout:

Text in Graphics, Markup, Text Layout Using HTML and CSS, Portable Documents, Further Information.

**UNIT IV:****Hypertext:**

A Short History of Hypertext and Hypermedia, The Nature of Hypertext, Links, Navigation and Structure in Hypertext, Further Information.

**Video:**

Digitizing video, Video Standards, Introduction to Video Compression, Quick Time, Digital Video Editing and Post-Production, Streamed Video and Video Conferencing, Further Information.

**Animation:**

Captured Animation and Image Sequences, Digital Cel and Sprite Animation, Key Frame Animation, 3-D Animation, Further Information.

**UNIT V:****Sound:**

The Nature of Sound, Digitizing Sound, Processing Sound, Compression, Formats, MIDI, Combining Sound and Picture, Further Information.

**Combining Media:**

Hypermedia, Synchronization-Based Presentations, Accessibility, Further Information.

**TEXT BOOK:**

1. Digital Multimedia, Nigel Chapman and Jenny Chapman, John Wiley & Sons LTD.

**CELLULAR AND MOBILE COMMUNICATIONS**

(ELECTIVE – IV)

**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 Omnidirectional 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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**4–0–4 ECM4224**

**SATELLITE COMMUNICATIONS**

**(ELECTIVE – IV)**

**UNIT – I:****INTRODUCTION:**

The Origin of Satellite Communications, a brief history of Satellite Communications, the Current State of Satellite Communications.

**ORBITAL ASPECTS OF SATELLITE COMMUNICATIONS:**

Orbitals, Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, Launches and launch vehicles, Orbital effects in communication systems performance.

**UNIT – II:****SPACE CRAFT:**

Introduction, Spacecraft subsystems, Attitude and orbit control system, Telemetry, Tracking and command, Power systems, Communication subsystems, Spacecraft antennas.

**UNIT – III:****SATELLITE LINK DESIGN:**

Basic transmission theory, System noise temperature and G/T ratio, Design of down links, Up link design, Design of satellite links for specified C/N.

**UNIT – IV:**

**MULTIPLE ACCESS:**

Frequency division multiple access (FDMA), Time division Multiple Access (TDMA), Code Division Multiple access (CDMA).

**UNIT – V:**

**EARTH STATION TECHNOLOGY:**

Earth station Design, Design of Large Antennas, Tracking, Small earth station Antennas, Equipment for Earth Stations.

**TEXT BOOKS:**

1. Satellite Communications – by Pratt, John Wiley.
2. Satellite Communications – by Robert M. Giglardi, CBS Publ.
3. Satellite Communications – by Agarwal.

**REFERENCES:**

1. Satellite Communications – by M. Richharia, MacMillan Publ.