

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

**ELECTRONICS &
INSTRUMENTATION ENGINEERING**

For

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



**JAWAHARLAL NEHRU
TECHNOLOGICAL UNIVERSITY**

KUKATPALLY, HYDERABAD - 500 072.



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

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

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

1. Award of B.Tech. Degree:

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

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

3. Courses of study:

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

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

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

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

4. Credits:

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

5. Distribution and Weightage of Marks:

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

- iii. For theory subjects, there shall be 5 objective type tests for a duration of 20 minutes each during the semester. Each test shall contain 20 objective type questions for 20 marks. The best 4 tests will be considered for awarding 20 sessional marks. For the 1 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 1 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.

- There shall be no branch transfers after the completion of admission process.
- 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:

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

- The Students have to acquire 156 credits from II to IV year of B.Tech. Programme (Regular) for the award of the degree.
- 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.
- The same attendance regulations are to be adopted as that of B. Tech. (Regular).
- Promotion Rule:
A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 44 credits from the examinations following
 - Two regular and one supplementary examinations of II Year I Semester
 - One regular and one supplementary examinations of II Year II Semester
 - One regular III year I Semester examination
- 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 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)

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

I Year B.Tech EIE

**ELECTRONICS & INSTRUMENTATION ENGINEERING
COURSE STRUCTURE**

CODE	SUBJECT	T	P	C
EI1021	English	3	-	6
EI1022	Mathematics – I	3+1*	-	6
EI1023	Solid State Physics	2+1*	-	4
EI1024	Information Technology & Numerical Methods	3	-	6
EI1025	C & Data Structures	3	-	6
EI1026	Network Theory	3	-	6
EI1027	Electronic Devices & Circuits	3	-	6
EI1028	Engineering Drawing Practice	-	3	4
EI1029	Computer Programming Lab.	-	6	8
EI1030	Electronic Devices & Circuits Lab.	-	3	4
		20+2*	12	56

(* TUTORIAL)

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II Year B.Tech EIE - I Semester

ELECTRONICS & INSTRUMENTATION ENGINEERING

COURSE STRUCTURE

CODE	SUBJECT	T	P	C
EI2121	Mathematics – II	4	-	4
EI2122	Electrical Technology	4	-	4
EI2123	Electromagnetic Theory	4	-	4
EI2124	Signals & Systems	4	-	4
EI2125	Instrumentation Components	4	-	4
EI2126	Switching Theory & Logic Design	4	-	4
EI2127	Electrical Technology Lab.	-	3	2
EI2128	Networks Lab.	-	3	2
		24	6	28

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II Year B.Tech EIE - II Semester

ELECTRONICS & INSTRUMENTATION ENGINEERING

COURSE STRUCTURE

CODE	SUBJECT	T	P	C
EI2221	Managerial Economics & Financial Analysis	4	-	4
EI2222	Mathematics – III	4	-	4
EI2223	Electrical & Electronic Measurements	4	-	4
EI2224	Control Systems	4	-	4
EI2225	Pulse & Digital Circuits	4	-	4
EI2226	Transducers in Instrumentation	4	-	4
EI2227	Pulse & Digital Circuits Lab.	-	3	2
EI2228	Instrumentation Lab. – I	-	3	2
		24	6	28

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III Year B.Tech EIE - I Semester

ELECTRONICS & INSTRUMENTATION ENGINEERING

COURSE STRUCTURE

CODE	SUBJECT	T	P	C
EI3121	Management Science	4	-	4
EI3122	Computer Organization	4	-	4
EI3123	Linear & Digital IC Applications	4	-	4
EI3124	Electronic Equipment Design	4	-	4
EI3125	Industrial Instrumentation	4	-	4
EI3126	Process Control Instrumentation	4	-	4
EI3127	IC Applications Lab.	-	3	2
EI3128	Process Control Lab.	-	3	2
		24	6	28

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III Year B.Tech EIE - II Semester

ELECTRONICS & INSTRUMENTATION ENGINEERING

COURSE STRUCTURE

CODE	SUBJECT	T	P	C
EI3221	Operating Systems	4	-	4
EI3222	Microprocessors & Interfacing	4	-	4
EI3223	Digital Signal Processing	4	-	4
EI3224	Communication Engineering	4	-	4
EI3225	Opto-electronic & Laser Instrumentation	4	-	4
EI3226	Biomedical Instrumentation	4	-	4
EI3227	Microprocessors Lab.	-	3	2
EI3228	Instrumentation Lab. – II	-	3	2
		24	6	28

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IV Year B.Tech EIE - I Semester

**ELECTRONICS & INSTRUMENTATION ENGINEERING
COURSE STRUCTURE**

CODE	SUBJECT	T	P	C
EI4121	Computer Networks	4	-	4
EI4122	Object Oriented Programming Through JAVA	4	-	4
EI4123	Analytical Instrumentation	4	-	4
EI4124	PC Based Instrumentation	4	-	4
ELECTIVE – I		4	-	4
EI4125	Power Plant Instrumentation			
EI4126	Database Management Systems			
ELECTIVE – II		4	-	4
EI4127	Digital Control Systems			
EI4128	Artificial Neural Networks			
EI4129	JAVA Programming Lab.	-	3	2
EI4130	Instrumentation Lab. - III	-	3	2
		24	6	28

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IV Year B.Tech EIE - II Semester

**ELECTRONICS & INSTRUMENTATION ENGINEERING
COURSE STRUCTURE**

CODE	SUBJECT	T	P	C
ELECTIVE – III		4	-	4
EI4221	Robotics & Automation			
EI4222	Industrial Electronics			
ELECTIVE – IV		4	-	4
EI4223	Management Information Systems			
EI4224	Telemetry & Telecontrol			
EI4225	Project & Seminar	-	-	8
		8	-	16

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I Year B.Tech EIE

3-0-6 EI1021

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. Bhatnagar (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).

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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.Narayanawamy (OL).
3. Examine Your English, by Margaret Maisson (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.Farhathulla (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.

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I Year B.Tech EIE

3-0-6 EI1022

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.

UNIT – VI :

Vector Differential Calculus :

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

Vector integral Calculus : Vector integration – Line integral – work done – Potential function – area, surface and volume integrals. Green's theorem, Stoke's and Gauss' Divergence Theorem. Verification of Green's, Stoke's and Gauss' Theorems. Curvilinear Coordinates – Cylindrical, Spherical Coordinates – Expressions of Grad, div, curl in Spherical, Cylindrical and Curvilinear Coordinates.

TEXT BOOKS :

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

REFERENCES :

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

SOLID STATE PHYSICS

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

UNIT – I (A):

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

UNIT – I (B):

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

UNIT – II (A):

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

UNIT – II (B):

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

UNIT – III (A): PRINCIPLES OF QUANTUM MECHANICS

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

UNIT – III (B): ELECTRON THEORY OF METALS

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

UNIT – IV (A): DIELECTRIC PROPERTIES

Introduction – Electronic, Ionic and Orientation polarization – Internal field – Clausius Mosotti equation – Ferro and 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
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). materials for different purposes.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
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I Year B.Tech EIE

3-0-6 EI1024

INFORMATION TECHNOLOGY & NUMERICAL METHODS

(Common for EEE, ECE, EIE, E.Cont.E., ICE, CSE, CSIT, 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.

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, 4th 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, 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, 3rd 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, 5th 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.

C & DATA STRUCTURES

(Common for EEE, ECE, EIE, E.Cont.E., ICE, CSE, CSIT, 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

NETWORK THEORY

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

UNIT – I:

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

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

UNIT – II:

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

UNIT – III:

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

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

UNIT – IV:

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

UNIT – V:

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

UNIT – VI:

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

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

TEXT BOOKS:

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

REFERENCES:

1. Network Analysis – by G.K. Mithal, Khanna Pub.
2. Network Theory – by N.C. Jagan and C. Lakshminarayana, BS Publ.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

I Year B.Tech EIE

3-0-6 EI1027

ELECTRONIC DEVICES & CIRCUITS

(Common for EEE, ECE, EIE, E.Capt.E., 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 TT 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.

2002 – 2003

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.

2002 – 2003

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

I Year B.Tech EIE

0–3–4 EI1028

ENGINEERING DRAWING PRACTICE

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

UNIT – I:

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

UNIT – II:

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

UNIT – III:

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

UNIT – IV:

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

UNIT – V:

Isometric Projections of Lines, Planes and Simple Solids.

UNIT – VI:

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

TEXT BOOKS:

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

2002 – 2003

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

I Year B.Tech EIE

0-6-8 EI1029

COMPUTER PROGRAMMING LAB

(Common for EEE, ECE, EIE, E.Cont.E., 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) $2.5 \log x + \cos 32^\circ + |x^2 - y^2| + v \cdot 2xy$
 - c) $1/av^2? e^{- (x-m/ \sqrt{2s})^2}$
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) $1 + x^2/2! + x^2/4! + \dots$ upto ten terms
 - d) $x + x^3/3! + x^5/5! + \dots$ upto 7th 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 traveled 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/sec²). 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.

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

Purchase Amount	Discount	(Percentage)
	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

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 $f(n) = f(n-1) + f(n-2)$ for $n > 2$.
 Write C program using do-while to calculate and print the first m fibonacci numbers.
11. Write C programs to print the following outputs using for loop.

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

12. Write a C program to extract a portion of a character string and print the extracted string. Assume that m characters are extracted starting with the nth character.
13. A Maruthi Car dealer maintains a record of sales of various vehicles in the following form:

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

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

14. Write a function that will scan a character string passed as an argument and convert all lower case characters into their upper case equivalents.
15. Implement the following data structures using Arrays
i) Stacks ii) Linear Queues iii) Circular queues iv) Dequeue.
16. Implement polynomial addition and multiplication with linked list sparse matrix.
17. Implement binary search tree using linked list and perform the following operations.
i) Insertion ii) Deletion iii) In-order Traversal iv) Pre-order 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 $f(x) = x \sin x + \cos x = 0$.
a) Bisection b) False Position c) Newton-Raphson
d) Successive approximation.
24. Write programs for implementing Gauss-Jordan and Gauss-Seidal methods for solving simultaneous algebraic equations given below.
 $9x_1 + 2x_2 + 4x_3 = 20$
 $x_1 + 10x_2 + 4x_3 = 6$
 $2x_1 - 4x_2 + 10x_3 = -15$.
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.
g) FrontPage 2000 Chapter 25

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

I Year B.Tech EIE

0-3-4 EI1030

ELECTRONIC DEVICES & CIRCUITS LAB

(Common for EEE, ECE, EIE, E.Cont.E., 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.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

II Year B.Tech EIE - I Semester

4-0-4 EI2121

MATHEMATICS – II

(Common for all branches)

UNIT – I:

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

UNIT – II:

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

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

UNIT – III: Fourier Series

Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

UNIT – IV:

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

UNIT – V:

Fourier integral theorem – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – properties – Inverse transforms – Finite Fourier transforms. Solution of one dimensional wave, heat equations and two dimensional Laplace's equation by Fourier transforms.

z-transform – Inverse z-transform – properties – Damping rule – shifting rule – Initial and final value theorems.

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

TEXT BOOKS:

1. A Text Book of Engineering Mathematics Volume – II - 2002
T.K.V. Iyengar, B. Krishna Gandhi and others, S. Chand and Company
2. Engineering Mathematics
B.V. Ramana, Tata McGraw-Hill -2002
3. Engineering Mathematics – II - 2002
C. Sankaraiah, Vijaya Publications
4. Engineering Mathematics – II - 2002
P. Nageswara Rao, Y. Narsimhulu, 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. Green Berg, Prentice Hall, Upper saddal 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 EIE - I Semester

4-0-4 EI2122

ELECTRICAL TECHNOLOGY

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

UNIT-I: DC MACHINES

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

UNIT-II: TRANSFORMERS:

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

UNIT-III: THREE PHASE INDUCTION MOTOR:

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

UNIT-IV:

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

Principle of operation of synchronous motor.

UNIT-V:

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

TEXT BOOKS:

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

REFERENCES:

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

ELECTROMAGNETIC THEORY

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

UNIT – I: ELECTROSTATICS

Review of vector of analysis. Coulomb's law. Electric field intensity, electric field intensity due to point charges, line charge, surface charge and volume charge distributions, electric field intensity due to standard charge configurations - point charge, uniform infinite line charge, uniform infinite planar charge, electric flux and flux density, Gauss's law, relation between electric field intensity and electric flux density, special Gaussian surfaces and applications of Gauss's law, Divergence Theorem, work done in moving a point charge, electric potential between two points, electric potential due to various charge configurations, equi-potential surfaces, gradient relationship between electric field intensity and electric potential.

Energy stored in static electric fields, Capacitance of conductors, Capacitance of standard conductor configurations - parallel plates, concentric cylinders, concentric spherical conductors, experimental mapping methods for electric fields. Dielectric polarization and relative permittivity. Poisson's and Laplace's equations, Electrostatic uniqueness theorem, boundary conditions in static electric fields.

UNIT-II: MAGNETOSTATICS

Magnetic induction, Faraday's law, Magnetic flux and Magnetic flux density. Biot Savart Law, Ampere's Circuital Law, Curl, Stokes's theorem, Magnetic vector potential, Lorentz force equation, Ampere's force law, Force between two parallel conductors, energy stored in steady magnetic fields, magnetization and permeability. Boundary conditions in magnetostatics, analogy between electric and magnetic fields.

UNIT – III: MAXWELLS EQUATIONS

Current continuity equation for time varying fields, inconsistency of Ampere's law, Maxwell's equations – differential form and integral form, word statement of field equations, Boundary conditions for electromagnetic fields – statement and proof, Maxwell's equations.

UNIT – IV: ELECTROMAGNETIC WAVES

Vector wave equations for source free regions, Plane Waves, Uniform Plane Wave Propagation, relation between E and H in a Uniform Plane Wave, Wave Equations for sinusoidally varying fields, Wave Propagation in lossless media and conducting media, Complex Propagation Constant, classification of materials as conductors and dielectrics, dissipation factor and power factor, Wave Propagation in good conductors and good dielectrics, Skin depth or Depth of Penetration, Polarization – Linear, Circular and Elliptical Polarizations, Axial ratio.

UNIT – V: REFLECTION AND REFRACTION OF PLANE WAVES – SURFACE WAVES

Reflection and refraction of plane waves at dielectric – dielectric – conductor interfaces for normal and oblique incidences, Brewster angle, Phenomenon of total internal reflection, Concept of surface wave, surface impedance of a conductor, the relation between surface resistance, Skin depth and conductivity of conductor.

POYNTING VECTOR

Poynting theorem, applications of Poynting vector, Instantaneous, average and complex Poynting vectors, Power loss calculation in a plane conductor.

REFERENCES:

1. Electromagnetic Waves and Radiating Systems – by E.C. Jordan and K.G. Balmain, PHI.
2. Elements of Electromagnetics – by Mathew N.O. Sadiku, Oxford Univ. Press, 2/e, 1995.
3. Introduction to Electromagnetic Fields – by Paul and Clayton, McGraw Hill, 3/e, 1998.
4. Electromagnetics – by John D. Kraus, MGH.
5. Fields and Waves in Communication Electronics – by Ramo, Whinnery and Van Duzer, John Wiley.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

II Year B.Tech EIE - I Semester

4-0-4 EI2124

SIGNALS & SYSTEMS

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

UNIT – 1: 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 (F.T.), F.T. of simple functions, concept of impulse function, F.T. 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 undersampling.

UNIT – II: SIGNAL TRANSMISSION THROUGH SYSTEMS:

Linear system, impulse response, response of a linear system, linear time invariant (LTI) system, Linear time variant (LTV) system, Transfer function of a 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 realization, relationship between bandwidth and rise time. Energy density spectrum, Parseval's theorem, power density spectrum.

UNIT – III: CORRELATION OF SIGNALS AND CONVOLUTION:

Cross correlation and auto correlation of functions, properties of correlation function, relation between auto correlation function and energy/power spectral density function.

UNIT – IV: LAPLACE TRANSFORMS:

Review of Laplace transforms, partial fraction expansion, inverse Laplace transforms, concept of region of convergence (ROC) for Laplace transforms. Constraints on ROC for various classes of signals, properties of L.T.s, relation between L.T. and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT – V: z - TRANSFORMS:

Fundamental difference between continuous and discrete time signals, discrete time complex exponential and sinusoidal signals, periodicity of discrete time complex exponential signal, concept of z-transform of a discrete sequence. Distinction between Laplace, Fourier & z-transforms. Region of convergence in z-transforms, constraints on ROC for various classes of signals, Inverse z-transforms, properties of z-transforms.

TEXT BOOKS:

1. Signals, Systems and Communications – by B.P. Lathi, BS Publ.
2. Signals and Systems – by A.V. Oppenheim, A.S. Willsky & S.H. Nawab, PHI, EEE.

REFERENCES:

1. Signals & Systems – by Simon Haykin, Wiley Student Ed.
2. Network Analysis – by M.E. Van Valkenberg, PHI Publ.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

II Year B.Tech EIE - I Semester

4-0-4 EI2125

INSTRUMENTATION COMPONENTS

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

UNIT – I: MECHANICAL COMPONENTS

Pivots & Bearings, Linkages, Gears, Belt Chain & Friction Drives, Dials, Scales, Pointers & Indicating mechanism, Ratchets, Counters, Escapement, Integrators, Rack & Pinion, Geneva Mechanism.

UNIT – II: PNEUMATIC COMPONENTS

Flapper nozzle, bellows, boosters, pneumatic relays, flip-flops, safety relief valves and pilot valves, pneumatic cylinders motors, pneumatic operated valves.

UNIT – III: ELECTRICAL & ELECTROMECHANICAL COMPONENTS

Transformers - Pulse transformers, Relays & Switches, Potentiometers, Synchros - Magnetic Amplifiers, AC & DC Servomotors, Stepper motors.

UNIT – IV: ELECTRONIC COMPONENTS

Different types of resistors, capacitances and inductors - Different types of diodes, Transistors – bipolar, FET and UJT, Thyristors - SCR, Diac and Triacs. Selected IC chips - 741, 555, 725, 723, LM317.

UNIT – V: OPTOELECTRONIC COMPONENTS

Optoelectronic devices - LED, LDR, Photo detector arrays, Opto couplers, PIN Diodes - Optical Components - Optical filters, resonators, reflectors, beam splitters, Optical flats, lenses, prisms, gratings.

REFERENCE BOOKS:

1. Gibson, T.E and Tetuer F.B., Control System Components, McGraw Hill, New York, 1993.
2. Greenwood, Mechanical Details for Product Design, McGraw Hill, New York, 1990.

2002 – 2003

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

II Year B.Tech EIE - I Semester

4-0-4 EI2126

SWITCHING THEORY & LOGIC DESIGN
(Common for ECE, EEE, EIE, E.Cont.E., CSE, CSIT, BME)

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.

2002 – 2003

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 and Finite Automata Theory – by Zvi Kohavi, TMH edition.
2. Digital Logic and Computer Design – by M. Morris Mano, PHI.
3. Digital Logic Design Principles – by Norman Balbarnian and 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, TMH.
4. Digital Systems: Principles and Applications – Ronald J. Tocci, Pearson Education / PHI.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

II Year B.Tech EIE - I Semester

0-3-2 EI2127

ELECTRICAL TECHNOLOGY LAB
(Common for EIE, E.Cont.E.)

The following experiments are required to be conducted as compulsory experiments:

1. Magnetization characteristics of D.C. Shunt generator. Determination of critical field resistance.
2. Swinburne's Test on DC shunt machine (Predetermination of efficiency of a given DC Shunt machine working as motor and generator).
3. Brake test on DC shunt motor. Determination of performance characteristics.
4. Speed control of DC shunt motor by
 - A. Armature voltage control method.
 - B. Field flux control method.
5. OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
6. By conducting load test on single-phase transformer, determination of regulation and efficiency of given single-phase transformer (with pure resistive load).
7. Brake test on 3-phase Induction motor (performance characteristics).
8. Regulation of alternator by synchronous impedance method.

In addition to the above eight experiments, any two of the experiments from the following list are required to be conducted:
9. Load test on DC Shunt Generator. (Determination of load characteristics.)
10. Load test on DC Series Generator. (Determination of load characteristics.)
11. Load test on DC Compound Generator. (Determination of load characteristics.)
12. Brake test on DC Compound motor. (Determination of performance characteristics.)

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HYDERABAD**

II Year B.Tech EIE - I Semester

0-3-2 EI2128

NETWORKS LAB
(Common for EIE, E.Cont.E.)

The following experiments are required to be conducted as compulsory experiments:

1. Serial and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
2. Time response of first order RC/RL network for periodic non-sinusoidal inputs – time constant and steady state error determination.
3. Two port network parameters – Z-Y Parameters, chain matrix and analytical verification.
4. Verification of Superposition and Reciprocity theorems.
5. Verification of maximum power transfer theorem. Verification on D.C., verification on AC with Resistive and Reactive loads.
6. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.
7. Current locus diagram with RL & RC, with R varying in both cases and with C varying.
8. Frequency response of high pass and low pass filters. Computation of bandwidth, cut-off frequencies and analytical verification.

In addition to the above eight experiments, any two of the experiments from the following list are required to be conducted:
9. Separation of Self and Mutual Inductance in a Coupled Circuit. Determination of Coefficient of coupling.
10. Harmonic analysis of non-sinusoidal waveform signals using Harmonic Analyzer and plotting Frequency Spectrum.
11. Determination of Form factor for non-sinusoidal waveform, by taking the magnetization current in a transformer as the applied voltage is varied. Experimental determination by measurement of RMS, Average values. Verification from the wave form output.
12. Generation of non-linear periodic waveform for the square wave using clipping and clamping. Control of average value of the output waveform.

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II Year B.Tech EIE - II Semester

4-0-4 EI2221

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

(Common for all Branches)

UNIT – I: INTRODUCTION TO MANAGERIAL ECONOMICS:

Managerial Economics: Definition, Nature and Scope. Demand analysis: Law of demand, demand determinants. Elasticity of demand: Definition, Types, Measurement and Significance – Demand Forecasting methods.

UNIT – II: THEORY OF PRODUCTION:

Firm and Industry – Production Function – Cobb Douglas Production Function – Laws of Returns – Internal and External Economies of scale.

Cost Analysis: Cost Concepts, Fixed versus Variable Costs, Explicit versus Implicit Costs, Out-of-Pocket Costs versus imputed Costs, Opportunity Costs, 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 Organizations – Features, Merits and Demerits of Sole Proprietorship, Partnership and Joint Stock Companies – Types of Companies – Public Enterprises – Types and 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 : Payback 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 (Debit-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.

TEXT BOOKS:

1. Joel Dean, Managerial Economics, PHI, 2001.
2. James C. Van Horne, Financial Management Policy, 12th edition 2002, PHI.
3. Varshney and Maheshwari, Managerial Economics, S. Chand & Co., 2000.
4. Y.K. Bhushan, Fundamentals of Business Organization and Management, S. Chand & Co.
5. Narayana Swamy, Financial Accounting, PHI, 2001.
6. A.R. Aryasri, Managerial Economics and Financial Analysis for JNTU (B.Tech), TMH, New Delhi.
7. R.K. Mishra et al, Readings in Accounting and Finance.
8. R.L. Gupta, Financial Accounting, Vol-I, S. Chand, New Delhi, 2001.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

II Year B.Tech EIE - II Semester

4-0-4 EI2222

MATHEMATICS – III
(Common for ECE, EEE, EIE, E.Cont.E., ME, PT, MetE)

UNIT – I:

Special functions : Gamma and Beta functions – Their properties – evaluation of improper integrals. Bessel functions – Properties – Recurrence relations – Orthogonality. Legendre polynomials – properties – Rodrigue's formula – Recurrence relations – Orthogonality.

UNIT – II:

Functions of a Complex variable – Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne -Thompson method.

Elementary functions: Exponential, trigonometric, hyperbolic functions and their properties – General power z^c , (c is complex) Principal value.

UNIT – III:

Complex integration : Line integral – evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula. Zero – singular point – Isolated singular point – pole of order m – essential singularity.

Complex Power series : Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series.

UNIT – IV:

Residue – Evaluation of residue by formula and by Laurent series Residue theorem. Evaluation of integrals of the type

a). Improper real integral $\int_{-\infty}^{\infty} f(x) dx$

b). $\int_{\alpha}^{\alpha+2\pi} f(\cos \theta, \sin \theta) d\theta$

c). Fourier integrals $\int_{-\infty}^{\infty} e^{imx} f(x) dx$

d). Integrals by indentation.

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d). Integrals by indentation.

Argument principle – Rouché's theorem – determination of number of zeros of complex polynomials. Fundamental theorem of Algebra, Liouville's Theorem.

UNIT – V:

Conformal mapping: Transformation by e^z , $\ln z$, z^2 , z^n (n a positive integer) $\sin z$, $\cos z$, $z + a/z$.

Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – properties – invariance of circles and cross ratio – Determination of bilinear transformation mapping 3 given points.

TEXT BOOKS:

1. A Text Book of Engineering Mathematics Volume – III, 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 – III, 2002
C.Sankaraiah, Vijaya Publications
4. Engineering Mathematics – III, 2002
P.Nageswara Rao, Y. Narsimhulu, Prabhakar Rao

REFERENCES:

1. Advanced Engineering Mathematics (Eighth edition)
Erwin Kreyszig John Wiley & Sons (ASIA) Pvt. Ltd. 2001
2. Advanced Engineering Mathematics (Second edition)
Michael D. Green Berg, Prentice Hall, Upper saddal River, New Jersey, 1998
3. Sarveswara Rao Koneru.
Engineering Mathematics, Orient Longman (Pvt.) Ltd. 2002
4. Engineering Mathematics – III.
N.P.Bali, Laxmi Publications (P) Ltd., New Delhi.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

II Year B.Tech EIE - II Semester

4-0-4 EI2223

ELECTRICAL & ELECTRONIC MEASUREMENTS
(Common for EIE, E.Cont.E.)

UNIT – I: ELECTRICAL INSTRUMENTS

Suspension galvanometer, Torque and deflection of galvanometer, Permanent magnet moving coil mechanism, DC ammeters, DC voltmeters, Voltmeter sensitivity, Series and Shunt type ohmmeters, multimeters, alternating current indicating instruments, thermo instruments, Electro-dynamometers in power measurements, Watt hour meter, Power factor meters, instrument transformers.

UNIT – II: ELECTRONIC INSTRUMENTS

FET input volt-ohm-ammeters, AC milli voltmeters, True RMS Voltmeters, Digital volt-ohm-ammeters. – Vector impedance meter, phase angle meters, Digital and Analog R.F. power and Voltage measurements, Q meter.

UNIT – III: OSCILLOSCOPES

Oscilloscope block diagram, Cathode Ray Tube (CRT) circuits, vertical deflection system, delay line, multiple trace, horizontal deflection system, oscilloscope probes, special storage oscilloscope, sampling oscilloscope, digital storage oscilloscope.

UNIT – IV: SIGNAL GENERATORS AND ANALYSERS

Sine & square wave audio generators and radio frequency synthesized signal generators, function generators, Heterodyne Wave Analyzers, Spectrum analyzers, Harmonic distortion analyzers.

UNIT – V: FREQUENCY AND TIME MEASUREMENTS

Basic standards, standard time base generators, frequency measurements, time measurements, period measurements, measurement errors.

TEXT BOOKS:

1. Electronic Instrumentation and Measurement Techniques – by W.D. Cooper.
2. Electronic Measurements – by Oliver and Cage (ISE).
3. Transducers and Display Systems – by B.S. Sonde (TMH).

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

II Year B.Tech EIE - II Semester

4-0-4 EI2224

CONTROL SYSTEMS
(Common for ECE, EIE, E.Cont.E.)

UNIT-I: INTRODUCTION

Concepts of Control systems – Open Loop and closed loop control systems and their differences – Different examples of control systems – Classification of Control systems.

MATHEMATICAL MODELS OF PHYSICAL SYSTEMS

Differential equations – transfer function and block diagram representation of systems considering electrical systems as examples, Block diagram and reduction using algebra – Representation by Signal flow graph - reduction using Mason's gain formula – translational and rotational mechanical systems.

UNIT-II: FEEDBACK CHARACTERISTICS OF CONTROL SYSTEMS

What is a Feedback? – Effects of feedback - reduction of parameter variations by use of feedback - Control over system dynamics - by the use of feedback - PID controller.

TRANSFER FUNCTIONS OF ELEMENTS OF CONTROL SYSTEMS

DC Servo motor- AC Servo motor- Synchro Transmitter and Receiver.

UNIT-III: TIME RESPONSE ANALYSIS

Standard test signals – Time response of first order systems – Characteristics Equation of Feedback control systems, Transient Response of second order systems – Time domain specifications – Steady State response – Steady State errors and error constants – Effects of proportional derivative, proportional integral systems.

CONCEPTS OF STABILITY

The concept of stability, Routh stability criterion – qualitative stability and conditional stability.

UNIT – IV: ROOT LOCUS TECHNIQUES

The root locus concept – construction of root loci – effects of adding poles and zeros to $G(s)H(s)$ on the root loci.

FREQUENCY RESPONSE ANALYSIS

Introduction, Frequency domain specifications – Bode diagrams – Determination of Frequency domain specifications and transfer function from the Bode Diagram – Phase margin and Gain margin - Stability Analysis from Bode Plots.

Polar Plots, Nyquist plots and applications of Nyquist criterion to find the stability – Effects of adding poles and zeros to $G(s)H(s)$ on the shape of the Nyquist diagrams, Constant M and N circle – Nichols Charts – Frequency Domain specifications from Nichols Charts.

UNIT-V**DESIGN AND COMPENSATION TECHNIQUES**

Introduction and Preliminary design considerations – Lead, Lag, Lead-Lag – Compensation Based on frequency response approach.

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalisation - solving the time invariant state equations – State Transition Matrix.

TEXT BOOKS:

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd Edition.
2. Modern Control Engineering – by Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., 3rd Edition, 1998.
3. Automatic Control Systems – by B.C. Kuo, Prentice Hall of India Pvt. Ltd., 7th Edition, 1997.
4. Control System Engineering - by NISE, 3rd Edition, John Wiley.

REFERENCES :

1. Control Systems by N.K. Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.

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

4-0-4 EI2225

PULSE & DIGITAL CIRCUITS

(Common for ECE, EEE, EIE, E.Cont.E., BME)

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 – by 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 EIE - II Semester

4-0-4 EI2226

TRANSDUCERS IN INSTRUMENTATION

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

UNIT – I:

Block diagram of instrumentation system, classification of transducers.

Performance characteristics of instrument: Static characteristics – static calibration. Accuracy, precision, errors in overall system. Static sensitivity, linearity, threshold, resolution, Hysteresis, Dead space, Span range.

Dynamic characteristics – generalized mathematical model of measurement system, operational and sinusoidal transfer function, zero, first and second order instruments and their response to step, ramp and impulse inputs. Loading effects under dynamic conditions.

UNIT – II: RESISTIVE TRANSDUCERS

Potentiometers, Strain gauges and their types, resistance thermometers - RTDs, Thermistors, Hot wire Anemometers.

INDUCTIVE TRANSDUCERS

Transformer types, electromagnetic types, Magnetostrictive variable remanance and variable permeability.

UNIT – III: CAPACITIVE TRANSDUCERS

Variable dielectric, Variable gap, Variable area types.

PIEZO ELECTRIC TRANSDUCERS

Piezo electric effect, Piezo resistive effect, Piezo electric materials.

UNIT – IV: FORCE BALANCE AND FORCE SUMMING

The force balance principle, Electrodynamic acceleration transducer, electrostatic pressure transducer etc.

UNIT – V: THERMAL AND RADIATION TRANSDUCERS

Thermal expansion transducers – thermometers, bimetallic strips. Thermoelectric sensors, thermocouples – laws and their reference junction considerations, optical pyrometers, two colour radiation pyrometers. Photosensors (Photodiode, Phototransistor, infrared LEDs).

REFERENCES:

1. Instrument Transducers – An Introduction to Their Performance and Design – by Herman K.P. Neubrat, Oxford University Press.
2. Measurement System : Applications and Design – by E.O. Doebelin, McGraw Hill Publications.
3. Instrumentation Measurement and Analysis – by B.C. Nakra and K.K. Chowdary.
4. Process Control Instrumentation Technology – D. Johnson, John Wiley and Sons.

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HYDERABAD**

II Year B.Tech EIE - II Semester

0-3-2 EI2227

PULSE & DIGITAL CIRCUITS LAB

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

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 EIE - II Semester

0-3-2 EI2228

INSTRUMENTATION LAB – I
(Common for EIE, E.Cont.E.)

(Minimum 10 experiments should be conducted)

1. DC meters using D' Arsonval Galvanometers.
2. AC meters using D' Arsonval Galvanometers.
3. Ohm meter.
4. RLC and Q measurement using Q – meter.
5. Study of CRO – Voltage, frequency and phase measurement.
6. Strain gauges.
7. Resistance Thermometer Devices.
8. LVDT.
9. Capacitive transducers.
10. Piezo – Electric Transducers.
11. Borden tube.
12. Acceleration transducer.

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III Year B.Tech EIE - I Semester

4-0-4 EI3121

MANAGEMENT SCIENCE
(Common for all Branches)

UNIT – I: INTRODUCTION TO MANAGEMENT

Concept of Management and Organization – Functions of Management, Evolution of Management Thought – Taylor's Scientific Management, Fayol's Principles of Management, Douglas Mc-Gregor's Theory X and Theory Y, Mayo's Hawthorne Experiments, Herzberg's Two Factor theory of Motivation, Maslow's Hierarchy of Human needs – Systematic 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 OPERATING 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 (HRM)

The concepts of HRM, Human Resource Development (HRD) and Personnel Management & Industrial Relations (PMIR) - HRM Vs PMIR, Basic functions of HR Manager: Manpower Planning, Recruitment, Selection, training, development, placement, wage and salary administration, promotion, transfer, separation, performance appraisal, grievance handling and welfare administration, job evaluation and Merit reading.

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UNIT – IV: INTRODUCTION TO STRATEGIC MANAGEMENT

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

UNIT – V: INTRODUCTION TO PERT/CPM

Network Analysis - project management – Program 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.

TEXT BOOKS:

1. Koontz and O. Donnel, Principles of Management, McGraw-Hill Publ., 2001.
2. Philip Kotler, Marketing Management, 2002 - PHI.
3. Gary Dessler, Human Resource Management, PEA, 2002.
4. L.S. Srinath, PERT/CPM, Affiliated East-West Press, New Delhi, 2000.
5. W. Glueck & L.R. Jauch, Business Policy and Strategic Management, McGraw-Hill, 1998.
6. A.R. Aryasri, Management Science for JNTU (B.Tech), TMH, 2002.
7. O.P. Khanna, Industrial Engineering and Management, Dhanpat Rai, 1999.
8. Chandra Bose, Management and Administration, Prentice Hall, 2002.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

III Year B.Tech EIE - I Semester

4-0-4 EI3122

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

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 disc organization, introduction to magnetic tape and CDROM.

UNIT IV:

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

UNIT V:

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

TEXT BOOKS:

1. Williams Stallings, Computer Organization and Architecture, PHI, 1998.
2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, McGraw Hill International Edition.
3. G. V. Anjaneyulu, Computer Organization, Himalaya Publishing House.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

III Year B.Tech EIE - I Semester

4-0-4 EI3123

LINEAR & DIGITAL IC APPLICATIONS
(Common for EIE, E.Cont.E., EEE, BME, Mechatronics)

UNIT – I: OPERATIONAL AMPLIFIERS

Design aspects of Monolithic Opamps, Ideal characteristics, Specifications, Offset Voltages and currents, frequency compensation techniques, measurement of op amp parameters, applications of op amps – inverting, non-inverting amplifiers, integrators, function generators, logarithmic amplifiers, instrumentation amplifiers, signal conditioning circuits, detectors.

UNIT – II:

555 Timer, 556 Function generator ICs and their applications. Three terminal regulators. IC 565 phase locked loops and their typical applications. IC 1496 (Balanced Modulator) Applications.

UNIT – III: ACTIVE FILTERS

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

UNIT – IV: LOGIC FAMILIES

DTL, TTL, ECL, IIL, MOS Logic families, Parameters and their comparison, Tristate logic, Interfacing of Logic Families, Flip-Flops.

UNIT – V:

Analog multiplexers, Sample and hold circuits, D/A converters – Resistive divider and ladder networks, A/D converters, counters – Ramp type, Dual slope, Integration technique, Successive approximation, Parallel comparison technique.

REFERENCE BOOKS:

1. Micro Electronics – by Jacob Millman (ISE).
2. Op Amps and Linear Integrated Circuits – by Ramakanth Gayakwad (PHI).
3. Integrated Circuits – by Botkar (Khanna).
4. Applications of Linear Integrated Circuits – by Clayton.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

III Year B.Tech EIE - I Semester

4-0-4 EI3124

ELECTRONIC EQUIPMENT DESIGN

UNIT – I: SYSTEMATIC PRODUCT DESIGN

Product design methodology, Design concepts and Guidelines, Design morphology, Economic and Technical feasibility, Structure and functions of electronic instrument. Utility concepts in reliability, Mortality curve, MTTF, MTBF, Series, Parallel and standby systems.

CONTROL PANEL DESIGN

Ergonomic aspects for design of electronic equipment, Displays, Visual, Conductory and tactical displays. Layout considerations of instruments.

UNIT – II: ELECTRONIC TEST EQUIPMENT (CIRCUIT DESIGN)

CRO, FET Voltmeter, Wave-analyzers, Logic Analyzer, LCR bridge, electronic relay system, IC-regulated power supply, Frequency meter, electronic counter, signal generators, Xerox machine, Fax, Electronic weighing machine, Electronic Workshop machine, Electronic Workshop equipment.

UNIT – III: INSTRUMENTAL PERFORMANCE

Noise reduction methods - grounding, isolating and shielding techniques. Environmental problems - Vibration pump, Thermal fatigue, Creep and EMI (Electromagnetic Interference), Chemical Humidity and Pressure.

UNIT – IV: PRINTED CIRCUIT BOARDS - FABRICATION TECHNOLOGY

Layout considerations and rules: General rules for design considerations of analog and digital PCBs. Art work, production, fabrication technology for single sided, double sided and multi layered PCBs including PCB base materials, Etching, plating, Photo printing, Screen printing, Anodizing of front panels. PC based artwork production.

UNIT- V: DESIGN OF COILS, TRANSFORMERS AND FABRICATION TECHNOLOGY

Design concepts of audio and pulse transformers and coils for R.F. applications, Magnetic and insulation materials, tests for these transformers. Magnetic amplifiers.

REFERENCES:

1. Design and Technology of PCB – by Bosshart, CEDT Publications.
2. Ergonomics, CEDT Publications.
3. Grounding, Shielding and Isolation, CEDT Publications.
4. Human Factors in Engineering and Design, CEDT Publications.
5. Series Coil Transformer Design, CEDT Publications.
6. Instrumentation Devices and Systems – by Rangan and Sarma, McGraw Hill Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

III Year B.Tech EIE - I Semester

4-0-4 EI3125

INDUSTRIAL INSTRUMENTATION

UNIT – I: METROLOGY

Measurement of length, Planeness, Area, Diameter, Roughness, Angle – Comparators – Gauge blocks – Optical Methods of length and distance measurements.

UNIT – II: SPEED VELOCITY AND ACCELERATION MEASUREMENT

Realtive velocity – Translational and Rotational velocity measurement – Revolution counters and Timers - Magnetic and Photoelectric pulse counting stroboscopic methods - Accelerometers of different types - Gyroscopes.

UNIT – III: FORCE, TORQUE, FREQUENCY AND VIBRATION MEASUREMENT

Force measurement – Different methods – Vibration measurement – Vibrators shaper – Piezoelectric and variable reluctance pick-ups – Torque measurement – Mechanical, optical and electrical methods – Frequency measurements – Oscilloscope method - Frequency counters.

UNIT – IV: DENSITY AND VISCOCITY MEASUREMENT

Density measurement – Strain Gauge load cell method – Buoyancy method - Air pressure balance method – Gamma ray method – Vibrating probe method. Viscosity measurement – Units of viscosity – Specific Gravity scales used in petroleum industries – different methods of measuring consistency and viscosity – Two float Viscorator – Industrial consistency meter.

UNIT – V: HUMIDITY AND MOISTURE MEASUREMENT

Humidity measurement – Electrical conductivity – Dielectric constant change in dimension – Cooling by evaporation and Psychrometers – Moisture measurement – Thermal drying – Distillation method – Chemical reaction methods – Electrical methods.

REFERENCES:

1. Measurement Systems – Applications and Design – by Doebelin E.O., 4/e, McGraw Hill International, 1990.
2. Process Instruments and Control Handbook – by Considine D.M., 4/e, McGraw Hill International, 1993.
3. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishers, 1986.
4. Instrument Technology, vol. I – by Jones E.B., Butterworths, 1981.

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HYDERABAD**

III Year B.Tech EIE - I Semester

4-0-4 EI3126

PROCESS CONTROL INSTRUMENTATION**UNIT – I: PROCESS DYNAMICS**

Process variables – Load variables – Dynamics of simple pressure, flow level and temperature process – interacting and non-interacting systems – continuous and batch process – self-regulation – Servo and Regulator operation – problems.

UNIT – II: CONTROL ACTIONS AND CONTROLLERS

Basic control actions – characteristics of two position, three position, Proportional, Single speed floating, Integral and Derivative control modes – PI, PD, PID control modes – Problems – Pneumatic, Hydraulic and Electronic Controllers to realize various control actions.

UNIT – III: OPTIMUM CONTROLLER SETTINGS

Evaluation criteria – $1/4^{\text{th}}$ decay ratio, IEA, ISE, ITAE - determination of optimum settings for mathematically described process using time response and frequency response. Tuning process curve reaction method – continuous oscillation method – damped oscillation method – problems.

UNIT – IV: FINAL CONTROL ELEMENTS

I/P Converter - pneumatic, electric and hydraulic actuators – valve positioner – control valves – characteristic of control valves – valve body – Globe, Butterfly, diaphragm, Ball valves – Control valve sizing – Cavitation, flashing – problems.

UNIT – V: MULTILoop CONTROL SYSTEM

Feed forward control – Ratio control – Cascade control – Split range – Multivariable control and examples from distillation column and Boiler system.

REFERENCES:

1. Process control – by Pollard A., Heinemann Educational Books, London, 1971.
2. Process Control – Harriott P., TMH, 1991.
3. Automatic Process Control – by Eckman D.P., Wiley Eastern Ltd., New Delhi, 1993.
4. G-Chemical Process Control – by Stephenoupolis, Prentice Hall, New Delhi.
5. Process Control – by Patranabis.

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III Year B.Tech EIE - I Semester

0-3-2 EI3127

IC APPLICATIONS LAB

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

(Minimum 10 experiments should be conducted)

1. Integrator and differentiator using 741 OPAMP.
2. A) Astable multivibrator using 555.
B) Monostable multivibrator using 555.
3. Function generator using 741 OPAMP.
4. Voltage regulator using 723.
5. Inverter Transfer Characteristics and study of logic gates.
6. Study of flip-flops using ICs.
7. 7490 Counter.
8. Half Adder, Full Adder and subtractor.
9. BCD to 7 segment decoder using IC 7447.
10. Three Terminal regulators 7805, 7809, 7912, 565 PLL, 566 VCO.
11. D/A Converter.
12. A/D Converter.
13. Study of PLAS.

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III Year B.Tech EIE - I Semester

0-3-2 EI3128

PROCESS CONTROL LAB

(Minimum 10 experiments should be conducted)

1. Flow level control unit.
2. Temperature level control unit.
3. Servo and regulator operation.
4. Realization of control actions: Pneumatic controllers, Hydraulic controllers, Electronic controllers.
5. Process tuning – Process reaction curve method.
6. Process tuning – continuous and damped oscillation method.
7. Operation of flow loop in plant.
8. Input convertor – Pneumatic actuator.
9. Input convertor – Hydraulic actuator.
10. Control valve characteristics (Different types).
11. Multi loop control systems – Ratio Control.
12. Multi loop control systems – Cascade Control.

OPERATING SYSTEMS

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

UNIT – I:

Computer System & Operating System Overview: Overview of Computer System hardware – Instruction execution- I/O function – Interrupts – Memory hierarchy – I/O Communication Techniques. Operating Systems – Objectives and functions, evaluation of operating systems – Example systems.

Process description and Control: Process states – process description – process control – processes and Threads – Examples of process description and control.

UNIT – II:

Memory management: Memory Management requirements – loading programs into main memory – virtual memory – hardware and control structures – OS software – Examples of memory management.

UNIT – III:

Uniprocessor Scheduling: Types of scheduling – Scheduling algorithms – I/O Management and disc scheduling, I/O devices, Organization of I/O functions, OS design issues, I/O buffering, Disc I/O, disc scheduling policies - example systems.

UNIT – IV:

Concurrency: Principles of Concurrency – Mutual exclusion – software and hardware approaches – semaphores – monitors – Message passing – Readers/Writers problem. Principles of deadlock – deadlock prevention, detection and avoidance – dining philosopher's problem – Example systems.

UNIT – V:

File management and Security: Overview of file management – file organization and access – file directories – file sharing – Record blocking – secondary storage management – Example system.

Security: Security Threads – Protection – intruders – Viruses –Trusted systems.

TEXT BOOKS:

1. William Stallings: Operating Systems, PHI Second Edition, 1997.

REFERENCES:

1. Understanding Operating Systems – by Ida M. Flynn and Ann McIver McHoes, Thomson Learning.
2. Operating Systems – by Charles Crowing, TME.
3. Operating System Concepts – by Silberschatz and Galvin, John Wiley.

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III Year B.Tech EIE - II Semester

4-0-4 EI3222

MICROPROCESSORS & INTERFACING

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

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, 2nd 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 EIE - II Semester

4-0-4 EI3223

DIGITAL SIGNAL PROCESSING

(Common for ECE, EIE, E.Cont.E., EEE, BME)

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 EIE - II Semester

4-0-4 EI3224

COMMUNICATION ENGINEERING
(Common for EIE, E.Cont.E., BME)

UNIT – I: MODULATION

Amplitude modulation and demodulation: AM, DSB-SC, SSB and VSB.

ANGLE MODULATION AND DEMODULATION

FM and PM, NBFM, WBFM, Pre-emphasis, De-emphasis.

UNIT – II: RADIO TRANSMITTERS

Frequency allocation of radio communication systems, broadcast standards for AM and FM.

Transmitters: Block diagram and functions of radio transmitters, AM, FM and PM.

UNIT-III: RADIO RECEIVERS

TRF and super heterodyne receivers, RF, mixer and IF stages, choice of IF. Image frequency, alignment and tracking of radio receivers. AGC, tone and volume controls. Receiver measurements. Communications receiver. FM receivers. Fading and diversity reception.

UNIT-IV: PULSE MODULATION SYSTEMS

Sampling theorem - statement and proof, types of sampling, TDM and FDM, principles of PAM, PWM and PPM methods. PCM, DM, ADM. Introduction to Binary, M-ary, ASK, FSK, PSK, DPSK and Q-PSK methods.

UNIT V: DATA TRANSFER TECHNIQUES

Asynchronous, synchronous, serial and parallel interface standards, communication media and adapters. Modems and their interfacing. Computer communication - Introduction to circuit switching, Message switching and Packet switching networks.

UNIT VI : NOISE

Sources and types of noise. Noise power spectral density, SNR, Noise figure.

REFERENCES

1. Electronic and Radio Engineering : Terman
2. Electronic Communication Systems: Kennedy
3. Communication Systems : B.P. Lathi
4. Radio Engineering : G.K. Mithal
5. Communication Systems : Simon Haykin
6. Data and Computer Communication : Williams Stallings
7. Electronic Communications : Robert J. Schoenbeck

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III Year B.Tech EIE - II Semester

4-0-4 EI3225

OPTO-ELECTRONIC & LASER INSTRUMENTATION

UNIT – I: OPTICAL FIBERS AND THEIR PROPERTIES

Introduction to optical fibers – Light guidance – Numerical aperture – Dispersion – Different types of fibers – Optical fibers for communication – Optical fibers for instrumentation.

UNIT – II: LASER FUNDAMENTALS

Laser configuration – Q-Switching – Mode locking – Different types of Lasers.

UNIT – III: FIBER OPTIC SENSORS

IR sources and detectors – Interferometric method of measurement of length – Moire fringes – Measurement of pressure, Temperature, Current, Voltage, Liquid level and strain – fiber optic Gyroscope – Polarization maintaining fibers – Applications.

UNIT – IV: LASER INSTRUMENTATION

Industrial applications of lasers – Bio-medical application – Laser Doppler velocity meter – Hologram and applications.

UNIT – V: OPTO-ELECTRONIC COMPONENTS

LED, LD, PIN & APD, Electro-optic, Magneto optic and Acousto-optic Modulators.

REFERENCES:

1. Lasers : Theory and Applications – by Thyagarajan K. and Ghatak A.K., Plenum Press, New York.
2. Lasers and Optical Engineering – by Das P., Springer International Students Edition, 1991.
3. Optical Electronics – by Ghatak A.K. and Thyagarajan K., Foundation Books, 1991.
4. Laser and Applications – by Guimarass W.O.N. and Mooradian A., Springer Verlag, 1981.

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III Year B.Tech EIE - II Semester

4-0-4 EI3226

BIO-MEDICAL INSTRUMENTATION

(Common for EIE, ECE)

UNIT – I: PHYSIOLOGY

Electrophysiology of muscle, Transmission of action potentials in muscles. Basic charge on cell. Depolarization, Types of muscles, Their electrophysical properties, Source and theories of bio-electric potentials. Electro-physiology of nerve and neuromuscular function, Transmission of impulse from nerve to muscle, Evoked Potentials. Physiology of Heart, Heart as a pump, Heart-Lung machine.

UNIT – II: BIO-MEDICAL TRANSDUCERS/ELECTRODES/RECORDERS

Various types of electrodes, their construction, performance and applications. Errors caused by electrodes in measurement of body potential.

Signal conditioning and processing circuits for medical recording systems.

UNIT – III: STIMULATION – ELECTROMYOGRAPHY (EMG)

Introduction to EMG, Stimulation, Strength duration curves, Myography, Electromyography with voluntary muscular action, Electromyography during electrical stimulation.

ELECTROCARDIOGRAPHY (ECG)

Origin of ECG, Electrocardiographic plane, different types of lead systems, electrode positions, ECG Instrumentation requirements, Interpretation of Electrocardiogram.

UNIT – IV: ELECTRO ENCEPHALOGRAPHY (EEG)

Introduction to EEG, Electrode locations for normal EEG, EEG Recording methods, Clinical value of EEG, the Characteristics of abnormal EEG.

UNIT – V: THERAPEUTIC INSTRUMENTS

Pacemaker, Defibrillator, Shortwave Diathermy, Blood flow and Blood pressure monitor, Arrhythmia monitor.

APPLICATIONS:

Microprocessor applications in Diagnostics, Ultrasound in Medicine, Computerized Tomography, Biotelemetry, Patient safety.

TEXT BOOKS:

1. Principles of Applied Biomedical Instrumentation – by L.A. Geddes and L.E. Baker, John Wiley and Sons.
2. Hand-book of Biomedical Instrumentation – by R.S. Khandpur, McGraw-Hill, 1987.
3. Biomedical Instrumentation and Measurements – by Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.
4. Biomedical Telemetry – by Mackay, Stuart R., John Wiley.

REFERENCES:

1. Medical Instrumentation, Application and Design – by John G. Webster, John Wiley.

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III Year B.Tech EIE - II Semester

0-3-2 EI3227

MICROPROCESSORS LAB

(Common for ECE, EIE, E.Cont.E., EEE, BME)

- 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.
- 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.

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III Year B.Tech EIE - II Semester

0-3-2 EI3228

INSTRUMENTATION LAB – II

(Minimum of ten experiments should be conducted.)

1. Design and simulation of Analog Circuits using CAD Package.
2. Design of PCBs using Packages and Fabrication of PCB.
3. Linearization of Thermistor using Microprocessor.
4. Study of Level monitoring Instruments using PLC.
5. pH measurements.
6. Measurement of Blood Pressure.
7. Calibration of P to I and I to P converters.
8. RPM indicator using Strobostrom/Gyroscope.
9. Measurement of Humidity.
10. Measurement of velocity of liquid using Ultrasonic (Doppler effect) method and also flow measurement.
11. Measurement of Level using Capacitance method/Transducer.
12. Displacement measurement using inductive pickup and capacitive pickup.
13. PID Controller setup (Flow/Temp. Level).

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IV Year B.Tech EIE - I Semester

4-0-4 EI4121

COMPUTER NETWORKS

(Common for ECE, EIE, E.Copt.E., EEE, CSE, CSIT)

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.

TEXT BOOK:

1. Computer Networks: A. S. Tanenbaum, 3rd Edition, PHI.

REFERENCES:

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.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

(Common for EIE, E Cont.E., BME)

UNIT – I:

Introduction to Java – Characteristics of Java – Java applications – Anatomy of application program – Java applets – Applications versus applets. Java building elements – identifiers – Data types – Programming style and documentation – control structures – if, nested if, if-else statements – switch statement – Loop structures – for, while and do loops.

Methods – creating a method and calling a method – overloading methods – debugging – recursion.

UNIT – II:

Object oriented programming – Objects and Classes – Passing objects to methods – instance variables and Class variables – instance methods and class methods – Scope of variables – Packages – Arrays and strings – sorting and searching arrays – array of objects – multi-dimensional arrays – string class – command line arguments. Class inheritance – super class and sub-class – Abstract classes – casting objects – interfaces.

UNIT – III:

Graphics programming – Abstract Window Toolkit (AWT) – Frames – event driven programming – layout managers – graphics classes – user interfaces – interface components – interactive graphical user interface – multiple windows applications.

UNIT – IV:

Applets and advanced graphics – applet class – passing parameters to applets – drawing with mouse – keyboard events – using layout manager and without layout manager.

UNIT – V:

Exception handling – exceptions and exception types – exception classes – cautions in using exception classes – multi-threading – thread class – thread states and priority – thread graphs – synchronization. Input and Output streams – Processing external files – Random Access files and Interactive input and output.

TEXT BOOK:

1. An Introduction to Java Programming – by Y. Daniel Liang, PHI.

ANALYTICAL INSTRUMENTATION

UNIT – I: pH AND CONDUCTIVITY & DISSOLVED COMPONENT ANALYSER

Conductivity meters – pH meters – Dissolved oxygen, hydrogen analyzers – Sodium analyzer – Silica analyzer and sampling systems.

UNIT – II: GAS ANALYSERS

Thermal conductivity types – CO monitor – Nox analyzer – H₂S analyzer system and sampling – Industrial analyzer circuits.

UNIT – III: CHROMATOGRAPHY

Gas chromatography – Liquid chromatography – their principles and applications – oxygen analyzer – paramagnetic type – detectors and sampling systems.

UNIT – IV: SPECTROPHOTOMETERS

UV, VIS Spectrophotometers – Single beam and double beam instruments – Instrumentation associated with the above Spectrophotometers – Sources and detectors – Sources and detectors for IR Spectrophotometers – Commercial instruments – FT IR Spectrometer – Flame emission and atomic absorption Spectrophotometer – Atomic emission Spectrophotometer – sources for Flame Photometers and online calorific value measurements.

UNIT – V: PRINCIPLE OF NUCLEAR MAGNETIC RESONANCE

Instrumentation associated with NMR Spectrophotometer – Introduction to mass spectrophotometers – Nuclear radiation detectors – Ionization chamber – GM Counter – Proportional Counter – Solid state detectors.

REFERENCES:

1. Instrumental Methods of Analysis – by Willard H.H., Merrit L.L., Dean J.A. and Seattle F.L., CBS Publishing and Distributors, 6/e, 1995.
2. Instrument Technology – by Jones B.E., Butterworth Scientific Publ., London, 1987.
3. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishing, New Delhi, 2/e, 1992.
4. Principles of Instrumental Analysis – by Skoog D.A. and West D.M., Holt Sounder Publication, Philadelphia, 1985.
5. Instrumental Analysis – by Mann C.K., Vickerks T.J. & Gullick W.H., Harper and Row Publishers, New York, 1974.
6. Handbook of Analytical Instruments – by Khandpur.

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IV Year B.Tech EIE - I Semester

4-0-4 EI4124

PC BASED INSTRUMENTATION

UNIT – I:**INTRODUCTION:**

PCs in Automated Measurement and control systems, Advantages and disadvantages.

HARDWARE OVERVIEW:

Evolution of PC family, subsystems of PC, self test and initialization of various subsystems.

UNIT – II:**OPERATING SYSTEMS :**

Essential features of OS for PC based Instrumentation, Overview of the features of additional software modules, booting process and command processor.

MOTHER BOARD:

Functional units of mother board and their intercommunication, "CPU Nucleus" logic, DMA, Interrupt Handling Data, Address and Control Bus, Logic, I/O slot signals, New generation mother boards.

UNIT – III:**BUS STANDARDS:**

Introduction to buses, Bus design considerations, Bus communication protocols, Bus topology, control signals.

CASE STUDIES: VME and ISA buses.

UNIT – IV:**STUDY OF STANDARD I/O CONTROLLER CARDS:**

I/O ports, serial and parallel ports, Bus slots, Study of 8255 add-on card, Keyboard, Mouse and VDU Controller Cards.

UNIT – V:**ADD-ON CARD DESIGN :**

Design considerations, Use of portstand, use of IRQ for additional hardware, Power requirements and physical dimensions of Add-on Cards, Device Drivers. Installable and executable device drivers, device driver development – A case study.

REFERENCES:

1. The Microcomputer Bus Structure and Interface Design – by Dexter A.L (Marcel Dekker).
2. IBM PC AT Reference Manual.
3. Peter Norton's Assembly Language Book for IBM PC – by Peter Norton, PHI.
4. PC Trouble Shooting – PHI.

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IV Year B.Tech EIE - I Semester

4-0-4 EI4125

**POWER PLANT INSTRUMENTATION
(ELECTIVE – I)**

UNIT – I: AN OVERVIEW OF POWER GENERATION

Brief survey of methods of power generation – Hydrothermal, Nuclear, Solar, Wind etc. Importance of instrumentation for power generation – Thermal power plants – Building blocks – Details of the Boiler Processes – PI diagram of Boiler – Cogeneration.

UNIT – II: PARAMETERS AND MEASUREMENTS

Electrical measurements – current, Voltage, Power, Frequency power factor, Trivector meter – Non electrical parameters, flow of feed water, fuel, air and steam with correction factors for temperature – Pressure – temperature – level radiation detectors – smoke density measurements – dust monitor.

UNIT – III: CONTROL LOOPS AND INTERLOCKS IN BOILERS

Combustion control – control of Main header Pressure, air/fuel ratio control – furnace draft and excessive air control, drum level (three element control) main and reheat steam temperature control, burner tilting up, bypass damper, superheater, spray and gas recirculation controls – BFP recirculation control – Hot well and deaerator level control – pulverizer control, Computers in Power Plants.

UNIT – IV: TURBINE MONITORING AND CONTROL

Condenser vacuum control – gland steam exhaust pressure control – Speed, vibration, Shell temperature monitoring and control – Lubricating oil temperature control – Hydrogen – generator cooling system.

UNIT – V: ANALYZERS IN POWER PLANTS

Thermal conductive type – paramagnetic type, Oxygen analyzer, infrared type and trim analyzer – Spectrum analyzer – hydrogen purity meter – Chromatography – pH meter – Conductivity cell – fuel analyzer, brief survey of pollution monitoring and control equipment.

REFERENCES:

1. Modern Power Stations Practice, vol. 6, Instrumentation, Controls and Testing - Pergamon Press, Oxford, 1971.
2. Power Plant Technology – by Wakil M.M., McGraw Hill.
3. Standard Boiler Operations - Questions and Answers – by Elonka S.M., and Kohal A.L., TMH, New Delhi, 1994.

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HYDERABAD**

IV Year B.Tech EIE - I Semester

4-0-4 EI4126

**DATABASE MANAGEMENT SYSTEMS
(ELECTIVE – I)**

(Common for E.I.E, E.Cont.E.)

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 – relational algebra – Estimating the cost – Relational Algebra Equivalences.

UNIT – IV: DATABASE DESIGN

Overview of data base design – ER Model – Features of ER model – Conceptual design using ER model, Scheme Refinement and Normal Forms – Scheme 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 Management Systems – by Raghu Rama Krishnan, McGraw Hill, 1998.

REFERENCE BOOKS:

1. Database Management and Design – by G.W. Hansen and J.V. Hansen, PHI, 1999.
2. Database System Concepts – by Henry Korth and others.
3. An Introduction to Database Systems – by Bipin C. Desai, Galgotia Publ., 1998.

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IV Year B.Tech EIE - I Semester

4-0-4 EI4127

**DIGITAL CONTROL SYSTEMS
(ELECTIVE – II)
(Common for EIE, E.Cont.E.)**

UNIT – I:

Introduction to Digital Control Systems, z-transform technique, Initial and Final value theorems, Solution of difference equations using z – transforms, pulse transfer function.

UNIT – II:

State space representation of digital systems, Solution of discrete time state space equation. Controllability and Observability, Stability tests of digital systems: Jury's stability test and Liapunov stability theorem for linear digital systems.

UNIT – III:

Design of digital control systems with digital controllers through Bilinear Transformation. Digital PID Controller, Design for dead beat response, pole placement design by state feedback for single input and multi-input systems, pole placement design by incomplete feedback or output feedback.

UNIT – IV:

Digital state observers - Design of full order and reduced order observers – Kalman Filter.

UNIT – V:

Principle, Design of digital systems: Design of digital control systems by maximum (minimum) principle - linear digital regulator design for finite time and infinite time problems, Solutions of discrete matrix, Ricatti equation.

REFERENCES:

1. Digital Control Systems – by B.C. Kuo, Holt, Rinehart, WILSON INC.
2. Discrete Time Control Systems – by K. Ogata, PHI.
3. Control System Engineering – by Nagrath and Gopal, Wiley Eastern.
4. Digital Control & State Variable Methods – by M. Gopal, TMH.

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HYDERABAD**

IV Year B.Tech EIE - I Semester

4-0-4 EI4128

**ARTIFICIAL NEURAL NETWORKS
(ELECTIVE – II)**

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

UNIT – I:

Introduction, Neuron models, network architectures, AI and Neural nets.

Learning processes: Error correction learning, Memory based learning, Hebbian learning, Competitive learning, Boltzmann learning, Learning with and without a teacher adaptation, statistical learning theory.

UNIT – II: PERCEPTRONS:

Single Layer Perceptrons: Adaptive filtering problem, linear least square filters, LMS algorithm, learning curves, annealing techniques, Perceptron and Bay's Classifier.

Multilayer Perceptrons: Back propagation algorithm, XOR problem, feature detection, back propagation and differentiation, Hessian Matrix, Cross validation, Network pruning techniques.

UNIT – III: RADIAL BASIS NETWORKS:

Covers theorem on the separability of patterns, Regularization Theory and Networks, Generalised RBF Networks, Approximation properties of RBF networks, comparison with Multilayer Perceptrons.

UNIT – IV: SELF ORGANISING MAPS

Introduction, self-organizing maps, SOM algorithm, properties of the feature map, learning vector quantization, contextual maps.

UNIT – V: APPLICATIONS OF ANN

Introduction, Direct Applications - Pattern Classification, Associative Memories, Optimization, Control Applications. Applications in Speech and Image Processing.

TEXT BOOKS:

1. Neural Networks—A Comprehensive Foundation – by Simon Haykin, Pearson Education.
2. Artificial Neural Networks – by B. Yegnanarayana, PHI.

REFERENCES:

1. Introduction to Neural Systems – by Zurada, Jaico Publ.
2. Neural Networks Design – by M.T. Hagon, H.B. Demuth and Mark Beale, Thompson Learning, Vikas Publ.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

IV Year B.Tech EIE - I Semester

0-3-2 EI4129

JAVA PROGRAMMING LAB

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

1. Write a JAVA Applet that prints a Box, an Oval, an Arrow and a Diamond using asterisks (*).
2. Write JAVA Applet that displays a check board pattern.

```

*   *   *   *   *   *   *   *   *   *   *   *
  *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *
  *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *
  *   *   *   *   *   *   *

```
3. Write a JAVA applet that reads in two integers and determines and prints if the first is a multiple of the second.
4. 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.
5. 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.
6. Write an applet that reads a non-negative integer and computes and prints its factorial.
7. Write an applet that estimates the value of the mathematical constant e.
8. Write an applet that computes the value of e^x .
9. Write an application that prints the following patterns

```

*
* *
* * *
* * * *
* * * * *
* * * * * *

```

```

* * * * *
* * * *
* * *
* *
*

```

```

      *
    * * *
  * * * * *
* * * * * *

```

10. Write an applet that inputs integers and passes them one at a time to a method – ISEVEN – which uses the module 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.
11. 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.
12. Write a method quality points that inputs a student average and returns 4 if a student's 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.
13. Write a method distance that calculates distance between two points (x1, y1) and (x2, y2). Incorporate this method into an applet that enables the user to enter the co-ordinates of the points.
14. Write an applet that uses a method – circle area – to prompt the user for the radius of a circle, and to calculate and print the area of the area of that circle.
15. Write a recursive method – string reverse – that takes a character array containing a string as an argument, prints the string backwards and returns nothing.
16. 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.
17. Write a program and supporting classes with inheritance to get- point, circle and cylinder.
18. Write a program and supporting classes with inheritance to get - point, square and cube.
19. 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.
20. Write an applet that inputs text and outputs text in uppercase and lower case letters.
21. Write an applet that records a series of strings and outputs only those strings beginning with the letter 'b'.
22. Creation of GUI for typical cases.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
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IV Year B.Tech EIE - I Semester

0-3-2 EI4130

INSTRUMENTATION LAB – III

1. Gas analyzer.
2. Gas and liquid chromatography.
3. Spectrometer: UV and VIS spectrometer.
4. Spectrometer: IR and FT IR Spectrometer.
5. Flame photometer.
6. Measurement of calorific value.
7. Mass spectrometer.
8. Nuclear radiation detector.
9. Interfacing of an analog signal to microcomputer through ADC.
10. Interfacing of a Digital signal to Microcomputer through DAC.
11. Interconnection of two microcomputers through serial interface through serial ports.
12. Data Acquisition System.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

IV Year B.Tech EIE - II Semester

4-0-4 EI4221

**ROBOTICS & AUTOMATION
(ELECTIVE – III)**

Common for EIE, E.Cont.E., BME)

UNIT – I: BASIC CONCEPTS

Definition and origin of robotics – Different types of robots – Various generations of robots – Degrees of freedom – Asimov's laws of robotics – Dynamic stabilization of robots.

UNIT – II: POWER SOURCES AND SENSORS

Hydraulic, pneumatic and electric drives – Determination of HP of motor and gearing ratio – Variable speed arrangements – Path determination – Machine vision – Ranging – Laser – Acoustic – Magnetic – Fiber optic and Tactile sensors.

UNIT – III: MANIPULATORS, ACTUATORS AND GRIPPERS

Construction of manipulators – Manipulator dynamics and force control – Electronic and pneumatic manipulator control circuits – and effectors – Various types of grippers – Design considerations.

UNIT – IV: KINEMATICS AND PATH PLANNING

Solution of inverse kinematics problem – Multiple solution – Jacobian work envelope – Hill climbing techniques – Robot programming languages.

UNIT – V: CASE STUDIES

Multiple robots – machine interface – Robots in manufacturing and non-manufacturing applications – Robot cell design – Selection of a robot.

REFERENCES:

1. Industrial Robotics – by Mikell P, Weiss G.M., Nagel R.N., Odrey N.G., McGraw Hill, 1986.
2. Robotics Technology and Flexible Automation – by Deb S.R, TMH, 1994.
3. Robots and Manufacturing Automation – Asfahi C.R., John Wiley, 1992.
4. Robotic Engineering: An Integrated Approach – by Klafter R.D., Chimielewski T.A., and Neign M., PHI, 1994.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

IV Year B.Tech EIE - II Semester

4-0-4 EI4222

**INDUSTRIAL ELECTRONICS
(ELECTIVE – III)**

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

UNIT – I: DC AMPLIFIERS

DC amplifiers, drift compensation techniques, differential amplifier.

UNIT – II: REGULATED POWER SUPPLIES

Series and shunt type, Protection techniques, Switching mode voltage regulator, Servo voltage stabilizer, Monolithic voltage regulators (fixed and variable).

UNIT – III: SCR AND THYRISTOR

Principle of operation and characteristics of SCR. Triggering of SCR, Diac and Triac, Commutation. Thyristor – Characteristics – Phase controlled half and full wave rectification.

UNIT – IV: APPLICATIONS OF SCR IN POWER CONTROL

Static circuit breaker, Over load protection, Inverters, Converters and Chopper circuits. Other applications of SCR, Industrial applications of Triac and Diac. (Single Phase Applications Only).

UNIT – V: INDUSTRIAL APPLICATIONS

Timing circuits, Welding control, Electronic DC motor control, Induction and Dielectric heating. Ultrasonic generators and applications.

REFERENCES:

1. Integrated Circuits and Semiconductor Devices – by Deboo and Burroughs (ISE).
2. Industrial Electronics – by G.K. Mithal (Khanna Publications).
3. Thyristors and Applications – by M. Rammurthy.
4. Integrated Electronics – by Millman and Halkias, McGraw Hill, ISE.
5. Engineering Electronics – Ryder.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,
HYDERABAD**

IV Year B.Tech EIE - II Semester

4-0-4 EI4223

**MANAGEMENT INFORMATION SYSTEMS
(ELECTIVE – IV)
(Common for EIE, E.Cont.E., EEE)**

UNIT – I: THE MEANING AND ROLE OF MIS :

What is MIS? Decision support systems, systems approach. The systems view of business, MIS organisation within the company. Management organisational theory and the systems approach.

Development of organizational theory, Management and organizational behavior, Management information and the systems approach.

UNIT – II: INFORMATION SYSTEMS FOR DECISION MAKING :

Evolution of an information system, Basic information systems, decision making and MIS, MIS as technique for making programmed decisions, design assisting information systems.

STRATEGIC AND PROJECT PLANNING FOR MIS :

General business planning, Appropriate MIS response, MIS planning – General, MIS Planning - details.

UNIT – III: CONCEPTUAL SYSTEM DESIGN :

Define the problems, Set systems objectives, Establish system constraints, Determine information needs, determine information sources, Develop alternative conceptual designs and select one, Document the system concept, Prepare the conceptual design report.

DETAILED SYSTEM DESIGN :

Inform and involve the organization, Arm of detailed design, Project management of MIS detailed design, Identify dominant and Trade off criteria, Define the subsystems, Sketch the detailed operating MIS systems and information flows, Determine the degree of automation of each operation, Inform and involve the organization again, Inputs, Outputs and processing, Early system testing, Software, Hardware and Tools, Propose an organization to operate the system, Document the detailed design, Revisit the manager – User.

UNIT – IV: IMPLEMENTATION, EVALUATION AND MAINTENANCE OF THE MIS :

Plan the implementation, Acquire floor space and plan space layouts organized for implementation, Develop procedures for implementation, Train

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the operating personnel, Computer related acquisitions, Develop forms for data collection and information dissemination, Develop the files, Test the system, Cut over, Document the system, Evaluate the MIS, Control and maintain the system.

UNIT – V: PITFALLS IN MIS DEVELOPMENT :

Fundamental weaknesses, Soft spots in planning, Design problem, Implementation the TAR PITE.

TEXT BOOKS:

1. Information systems for modern management – by R.G. Murdick, J.B. Russ and J.R. Clagget.
2. Management Information Systems – by W.S. Jawadekar, TMH.

REFERENCES:

1. Management Information Systems – by J.A. O'Brien, Irwin (MGH).
2. Management Information Systems – by G.B. Dour and M.H. Olson, McGraw Hill, 2/e, 1985.
3. Decision Support Systems for Effective Planning and Control – by R.J. Thireramp, PHI, 1982.
4. Management Information Systems – by S. Sadagopan, PHI, 1998.
5. Management with Information – by J. Kanter, PHI, 4/e, 1998.
6. Management Information Systems: Organization and Technology – by K.C. Ladon and J.P. Landon, PHI, 4/e, 1999.

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IV Year B.Tech EIE - II Semester

4-0-4 EI4224

TELEMETRY & TELECONTROL

(ELECTIVE – IV)

(Common for EIE, E.Cont.E)

UNIT – I: TELEMETRY FUNDAMENTALS AND CLASSIFICATION

Fundamental concepts – Significance, Principle, Functional blocks of Telemetry and Telecontrol system – Methods of Telemetry – Electrical, Pneumatic, Hydraulic and Optical Telemetry – State of the art – Telemetry Standards.

UNIT – II: LANDLINE TELEMETRY

Electrical telemetry – Current systems – Voltage systems – Synchro systems – Frequency systems – Position and Pulse systems – Example of a land line Telemetry System.

UNIT – III: RADIO TELEMETRY

Block diagram of a Radio Telemetry system – Transmitting and receiving Techniques – AM, FM, PM. Multiplexing and Demultiplexing – Transmitting and Receiving Techniques – Digital Coding Methods – Advantages of PCM, PWM, PPM, FSK – Delta modulation – Coding and Decoding Equipment – Example of a Radio Telemetry System.

UNIT – IV: OPTICAL TELEMETRY

Optical fibers for signal transmission – Sources for fiber optic transmission – Optical detectors – Trends in fiber optic device development – Example of an Optical Telemetry System.

UNIT – V: TELECONTROL METHODS

Analog and Digital techniques in Telecontrol, Telecontrol apparatus – Remote adjustment, Guidance and regulation – Telecontrol using information theory – Example of a Telecontrol System.

REFERENCES:

1. Handbook of Telemetry and Remote Control – by Gruenberg L., McGraw Hill, New York, 1987.
2. Telecontrol Methods and Applications of Telemetry and Remote Control – by Swoboda G., Reinhold Publishing Corp., London, 1991.
3. Telemetry Engineering – by Young R.E., Little Books Ltd., London, 1988.
4. Data Communication and Teleprocessing System – by Housley T., PH Intl., Englewood Cliffs, New Jersey, 1987.