

ADMISSION & EXAMINATION RULES
for
BACHELOR OF TECHNOLOGY
(ELECTRONICS AND COMMUNICATION ENGINEERING)
B. TECH. (ECE)

1. OBJECTIVE

To prepare highly skilled professionals, with a strong conceptual and theoretical background in the fields of Electronics & Communication.

2. THE PROGRAMME

Highlights of the course are described in the following table:

a.	<i>Name of the Programme</i>	BACHELOR OF TECHNOLOGY (ELECTRONICS AND COMMUNICATION ENGINEERING) - B. TECH. (ECE)
b.	<i>Nature</i>	Regular and Full Time
c.	<i>Duration</i>	Four Years (8 Semesters)
d.	<i>Total number of credits</i>	224
e.	<i>Medium of Instruction and English Examinations</i>	English
f.	<i>Eligibility Criteria</i>	A candidate seeking admission to this program must have passed Senior Secondary (12th / Intermediate) examination with Mathematics and Physics compulsory, and one subject out of the following: Computer Science, Chemistry, Electronics from CBSE or any other Board recognized by Jamia Hamdard as equivalent thereto, securing atleast 50% marks or equivalent CGPA in aggregate.
g.	<i>Selection procedure</i>	Selection will be based on merit in Paper-1 of JEE (Main) of corresponding year, conducted by CBSE. <i>In case the seats remain unfilled, Jamia Hamdard may admit candidates on the basis of merit of qualifying examination or the merit of internal test and/or Interview conducted by Jamia Hamdard which will be announced separately, if situation arises.</i>
h.	<i>Total Seats</i>	60; inclusive of seats reserved for NRI / sponsored candidates; additional seats are available for Foreign Nationals.
i.	<i>Period of Completion</i>	Not more than 07 years (14 Semesters)
j.	<i>Commencement of the Programme</i>	July of the every academic session

3. PROGRAMME STRUCTURE

Semester-wise course structure, guidelines for teaching, practical and associated assessment of the programme is described in the following tables:

Course Type	Credits	Percentage (%) (Approx)
Foundation Core (FC)	50	22
Departmental Core (DC)	134	60
Departmental Electives (DE)	24	11
Open Electives (OE)	16	7
Total	224	100

L-T-P stands for number of contact hours as Lecture-Tutorial-Practical in a week.

Semester – I

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BTECE 101	Applied Mathematics – I	FC	30	70	100	3-1-0	4
BTECE 102	Applied Physics – I	FC	30	70	100	3-1-0	4
BTECE 103	Applied Chemistry	FC	30	70	100	3-1-0	4
BTECE 104	Fundamentals of Electrical Engineering	FC	30	70	100	3-1-0	4
BTECE 105	Introduction to Computer programming	FC	30	70	100	3-1-0	4
BTECE 106	Communication Skills – I	FC	30	70	100	0-2-2	2
BTECE 107	Applied Physics – I Lab	FC	50	50	100	0-0-4	2
BTECE 108	Electrical Engineering Lab	FC	50	50	100	0-0-4	2
BTECE 109	C programming Lab	FC	50	50	100	0-0-4	2
					Total	15-7-14	28

Semester – II

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BTECE 201	Applied Mathematics – II	FC	30	70	100	3-1-0	4
BTECE 202	Applied Physics-II	FC	30	70	100	3-1-0	4
BTECE 203	Engineering Mechanics	FC	30	70	100	3-1-0	4
BTECE 204	Basics of Electronics	DC	30	70	100	3-1-0	4
BTECE 205	Communication Skills-II	FC	30	70	100	0-2-2	2
	OE-1	OE	30	70	100	4-0-0	4
BTECE 206	Applied Physics – II Lab	FC	50	50	100	0-0-4	2
BTECE 207	Electronics Lab	DC	50	50	100	0-0-4	2
BTECE 208	Workshop Practice	FC	50	50	100	0-0-4	2
*BTECE ES	Environmental studies				100	2-0-0	0
Total						18-4-16	28

**This subject may be taught in both the semesters (Semester-I and Semester-II) at the discretion of the Department. However, Semester Examination will be conducted only at the end of Semester-II.*

Semester – III

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BTECE 301	Applied Mathematics – III	FC	30	70	30	3-1-0	4
BTECE 302	Analog Electronics	DC	30	70	30	3-1-0	4
BTECE 303	Digital Electronics	DC	30	70	30	3-1-0	4
BTECE 304	Signals and Systems	DC	30	70	30	3-1-0	4
BTECE 305	Electronics Instrumentation & Measurement	DC	30	70	30	3-1-0	4
	OE-2	OE	30	70	100	3-1-0	4
BTECE 306	Analog Electronics Lab	DC	50	50	100	0-0-4	2
BTECE 307	Digital Electronics Lab	DC	50	50	100	0-0-4	2
Total						18-6-8	28

Semester-IV

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BTECE 401	Analog Integrated Circuit	DC	30	70	100	3-1-0	4
BTECE 402	Digital System Design	DC	30	70	100	3-1-0	4
BTECE 403	Electromagnetic Theory	DC	30	70	100	3-1-0	4
BTECE 404	Communication Systems	DC	30	70	100	3-1-0	4
BTECE 405	Computer Architecture	DC	30	70	100	3-1-0	4
BTECE 406	Network Analysis and Synthesis	DC	30	70	100	3-1-0	4
BTECE 407	Digital System Design Lab	DC	50	50	100	0-0-4	2
BTECE 408	Analog Integrated Circuit Lab	DC	50	50	100	0-0-4	2
BTECE LS	Self-Study/Library/Sports	DC	50	50	100	0-0-2	0
Total						18-6-14	28

Semester-V

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BTECE 501	Information Theory and Coding	DC	30	70	100	3-1-0	4
BTECE 502	Digital Signal Processing	DC	30	70	100	3-1-0	4
BTECE 503	Antenna and Wave Propagation	DC	30	70	100	3-1-0	4
BTECE 504	Digital Communication	DC	30	70	100	3-1-0	4
BTECE 505	Microprocessors and Interfacing	DC	30	70	100	3-1-0	4
BTECE 506	Computer Architecture & Microprocessor Interfacing Lab	DC	50	50	100	0-0-4	2
BTECE 507	Digital Signal Processing Lab	DC	50	50	100	0-0-4	2
BTECE 508	Digital Communication Lab	DC	50	50	100	0-0-4	2
BTECE 509	Minor Project-I	DC	50	50	100	0-0-4	2
Total						15-5-16	28

Semester-VI

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BTECE 601	Micro wave Engineering	DC	30	70	100	3-1-0	4
BTECE 602	Data Structures	DC	30	70	100	3-1-0	4
BTECE 603	Embedded Systems	DC	30	70	100	3-1-0	4
	DE-1	DE	30	70	100	3-1-0	4
	OE-3	OE	30	70	100	3-1-0	4
BTECE 604	Microwave Engineering Lab	DC	50	50	100	0-0-4	2
BTECE 605	Embedded System Lab	DC	50	50	100	0-0-4	2
BTECE 606	Minor Project-II	DC	50	50	100	0-0-4	2
#BTECE 607	Industrial Training-I	DC	50	50	100	0-0-4	2
Total						15-5-16	28

4-6 weeks Industrial/Departmental training will be held after fifth semester. However, Viva-Voce will be conducted in the sixth semester.

Semester-VII

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BTECE 701	VLSI Design	DC	30	70	100	3-1-0	4
BTECE 702	Computer Communication Networks	DC	30	70	100	3-1-0	4
	DE -2	DE	30	70	100	3-1-0	4
	DE-3	DE	30	70	100	3-1-0	4
	OE-4	OE	30	70	100	3-1-0	4
BTECE 704	Lab based on DE	DE	50	50	100	0-0-4	2
BTECE 705	Major Project (Part-I)	DC	200	100	300	0-0-12	4
@BTCE 706	Industrial Training-II	DC	50	50	100	0-0-4	2
Total						15-5-20	28

@4-6 weeks Industrial/Departmental training will be held after sixth semester. However, Viva-Voce will be conducted in the seventh semester.

Semester-VIII

Paper Code	Title of the Paper	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
BTECE 801	Mobile Communication Systems	DC	30	70	100	3-1-0	4
	DE-4	DE	30	70	100	3-1-0	4
	DE-5	DE	30	70	100	3-1-0	4
BTECE 802	Lab based on DE	DE	50	50	100	0-0-4	2
BTECE 803	Mobile Communication and Networks Lab	DC	50	50	100	0-0-4	2
BTECE 804	Seminar	DC	50	50	100	0-0-4	2
BTECE 805	Major Project (Part-II)	DC	300	200	500	0-0-20	10
Total						9-3-32	28

Grand Total of Credits = 224

DEPARTMENTAL ELECTIVES (DE)

Paper Code	Title of the Paper	Marks			L-T-P	Credits
		Internal Assessment	Semester Exam	Total		
DE-1						
BTECE DE11	Sensors and Instrumentation	30	70	100	3-1-0	4
BTECE DE12	Advanced Computer Architecture	30	70	100	3-1-0	4
BTECE DE13	Information Security	30	70	100	3-1-0	4
BTECE DE14	Modern Filter Design	30	70	100	3-1-0	4
BTECE DE15	Statistical Signal Processing	30	70	100	3-1-0	4
DE-2						
BTECE DE21	Digital Image Processing	30	70	100	3-1-0	4
BTECE DE22	Satellite Communication	30	70	100	3-1-0	4
BTECE DE23	Optical Communication	30	70	100	3-1-0	4
BTECE DE24	Nonlinear Circuits and Systems	30	70	100	3-1-0	4
BTECE DE25	Microwave Integrated Circuits	30	70	100	3-1-0	4

DE-3						
BTECE DE31	Optical Networks	30	70	100	3-1-0	4
BTECE DE32	Digital System Testing and diagnosis	30	70	100	3-1-0	4
BTECE DE33	Detection and Estimation Theory	30	70	100	3-1-0	4
BTECE DE34	High Speed Networks	30	70	100	3-1-0	4
BTECE DE35	Signal Processing	30	70	100	3-1-0	4
BTECE DE36	CMOS Analog IC	30	70	100	3-1-0	4
DE-4						
BTECE DE41	Fault Tolerant Computing	30	70	100	3-1-0	4
BTECE DE42	Audio and Video Engineering	30	70	100	3-1-0	4
BTECE DE43	Pattern Recognition	30	70	100	3-1-0	4
BTECE DE44	Information Security	30	70	100	3-1-0	4
BTECE DE45	Wireless Sensor Networks	30	70	100	3-1-0	4
BTECE DE46	Nano Electronics	30	70	100	3-1-0	4
BTECE DE47	Speech Processing	30	70	100	3-1-0	4
BTECE DE48	Fault Tolerant Computing	30	70	100	3-1-0	4
DE-5						
BTECE DE51	Soft Computing	30	70	100	3-1-0	4
BTECE DE52	Computer Vision	30	70	100	3-1-0	4
BTECE DE53	Neuro Electronics	30	70	100	3-1-0	4
BTECE DE54	Power Electronics	30	70	100	3-1-0	4
BTECE DE55	Probability and Stochastic Processes	30	70	100	3-1-0	4
BTECE DE56	Bio-Medical Engineering and Instrumentation	30	70	100	3-1-0	4

OPEN ELECTIVES (OE)

Paper Codes	Title of the Paper	Marks			L-T-P	Credits
		Internal Assessment	Semester Exam	Total		
OE-1						
BTECE OE11	Principles of Management	30	70	100	3-1-0	4
BTECE OE12	Financial Accounting	30	70	100	3-1-0	4
BTECE OE13	Technology and Culture	30	70	100	3-1-0	4
BTECE OE14	Operational Research	30	70	100	3-1-0	4
OE-2						
BTECE OE21	Organizational Behavior	30	70	100	3-1-0	4
BTECE OE22	Customer Relationship Management	30	70	100	3-1-0	4
BTECE OE23	Managing and Marketing Technology	30	70	100	3-1-0	4
BTECE OE24	Knowledge Management	30	70	100	3-1-0	4

OE-3						
BTECE OE31	ERP	30	70	100	3-1-0	4
BTECE OE32	IPR and Cyberlaws	30	70	100	3-1-0	4
BTECE OE33	Artificial Intelligence					
BTECE OE34	Android based App development	30	70	100	3-1-0	4
BTECE OE35	Engineering Economics	30	70	100	3-1-0	4
OE-4						
BTECE OE41	Operating System	30	70	100	3-1-0	4
BTECE OE42	Knowledge Based System and Robotics	30	70	100	3-1-0	4
BTECE OE43	Java Programming	30	70	100	3-1-0	4
BTECE OE44	Web Programming	30	70	100	3-1-0	4

4. MODE OF CURRICULUM DELIVERY

Mode of curriculum delivery includes classroom teaching, assignments, test, lab work, presentations, participation in relevant events and regularity.

5. ATTENDANCE

- a. All students are supposed to attend every lecture and practical classes. However, the attendance requirement for appearing in the examination shall be a minimum of 75% of the classes held.
- b. Each one-period teaching shall account for one attendance unit.
- c. The concerned teacher will take a roll call in every scheduled class, maintains and consolidate the attendance record, which would be submitted to the Head of the Department at the conclusion of the semester.
- d. Attendance on account of participation (with prior permission from the Head of the Department) in the co-curricular/extra-curricular activities can be granted by the Dean on receipt of certificates or recommendations of the respective activity issued by the Head of the Department.
- e. Attendance records displayed on the Notice Board from time to time, in respect of short attendance, shall be deemed to be a proper notification and no individual notice shall be sent to the students/local guardian.
- f. In case a student is found to be continuously absent from the classes without information for a period of 30 days, the concerned teacher shall report it to the Head of the Department.
- g. Head of the Department may recommend for striking off the name of a student from rolls, after ensuring 'one month continuous absence', from all the concerned teachers.
- h. A student, whose name has been struck off on account of long absence may apply to the Dean for readmission within 15 days of the notice of striking off the name. The readmission shall be effected on payments of prescribed readmission fees.
- i. A student with less than 75% attendance in a subject shall not be allowed to appear in that subject in the semester examination. The Head of the Department shall recommend all such cases to the Dean of the School.

- j. The Dean, on the recommendation of the Head of the Department, may consider the relaxation of attendance up to 10% on account of sickness and /or any other valid reason. No application for relaxation of attendance (duly certified by a Registered Medical Practitioner/Public hospital or a competent authority) will be entertained after 15 days from the recovery from illness etc.

6. INTERNAL ASSESSMENT

- a. Internal assessment, to be made by concerned teachers, will be based on minor tests, quizzes, presentation, programming test, demonstrations and assignments.
- b. Maximum of Three minor tests, with a total of 20 marks, for each theory paper shall be mandatory. Other modes of assessment shall account for remaining 10 marks.
- c. A minor test each shall be scheduled after the completion of first and second term.
- d. Dates for minor test will be announced at the beginning of the semester, by the examination coordinator.
- e. The teacher concerned shall maintain a regular record of the marks obtained by students in minor tests and display the same in due course.
- f. The concerned teachers shall submit the compiled internal assessment marks to the Head of the Department, on the conclusion of teaching of the current semester.
- g. The Head shall display a copy of the compiled sheet, of internal assessment marks of all the papers, before forwarding it to the Controller of Examination, i.e. at the conclusion of the semester.
- h. A promoted candidate, who has to reappear in the examination of a paper, will retain internal assessment marks.
- i. In the case of re-admission, the candidates shall have to go through the internal assessment process afresh and shall retain nothing of the previous year.

7. SEMESTER EXAMINATIONS

Prescriptions for conducting semester examinations of theory and lab papers, those shall be conducted after the conclusion of each of the semesters, are presented in the following table:

a.	Mode	(Theory Papers)	Written only
		(Lab Papers)	Written, Demo, Programming and viva- voce.
b.	Duration	(Theory paper)	03 Hours
c.	Total Marks	(Theory Papers)	70 (Seventy only)
		(Lab Papers)	50 (Fifty only)

8. MAJOR PROJECT

- a. Each student of the final year will have to go for Major Project work either in the Industry or in the Department under the guidance of one or two faculty members.
- b. Period of completion of Major Project work shall be full one semester.
- c. There shall normally be two supervisors-one internal and one *external (in the case of industry project form the place where the student is pursuing project-work)*.
- d. All the students, who are pursuing the Major project work, shall be continuously in touch with the internal supervisor.
- e. **There shall be a mid-term evaluation of the progress** and the internal supervisors will conduct it. However, an internal supervisor may ask the student to submit a confidential progress-report from the external supervisor (*in the case of industry project*).
- f. All the candidates shall submit **Three (03)** hard copies of the project reports that are duly approved and signed by internal as well as external (*if applicable*) supervisors.
- g. An external examiner, appointed for the purpose, shall evaluate the project report.
- h. The Head of the Department shall fix a date and time for viva-voce examinations, on receipt of the evaluation-report of the project reports from the external examiner.
- i. Head of the Department shall forward the compiled total marks (awarded in internal assessment, project Report and Viva-voce Examination), in the project-semester of each of the candidate, to the Controller of Examination.

9. EXAMINATION

- a. The performance of a student in a semester shall be evaluated through continuous class assessment and end semester examination. The continuous assessment shall be based on class tests, assignments/ tutorials, quizzes/ viva voce and attendance. The end semester examination shall be comprised of written papers, practical and viva voce, inspection of certified course work in classes and laboratories, project work, design reports or by means of any combination of these methods.
- b. The marks obtained in a subject shall consist of marks allotted in end semester theory paper, practical examination and sessional work.
- c. The minimum pass marks in each subject including sessional marks (Theory, Practical or Project etc.) shall be 40%.

10. PROMOTION SCHEME

- a. A student will be promoted from 1st year to 2nd year/2nd year to 3rd year/3rd year to 4th year provided that he/she is **not having more than 07 (Seven) backlog papers** (including Labs; excluding non-credit papers) in total. A student who fails to satisfy the criteria mentioned for the promotion shall **detained** in the same year.
- b. A **detained** Student is not allowed to re-appear in the minor tests. His/her old internal assessment marks will remain same. However, he/she will be required to re-appear in the semester examination for those papers in which he/she had failed, when these papers are offered again (Examination for Odd semester paper will be held in Odd semester, and for Even semester papers will be held in Even semester).

- c. **Supplementary Examination:** For the final year students, students can appear in supplementary examinations in their all backlog papers after the declaration of their Final semester results only.

11. THE GRADING SYSTEM

As per University Rule

12. CALCULATION OF SGPA AND CGPA OF A STUDENT IN A SEMESTER

As per University Rule

After having passed all the EIGHT semesters, the students shall be eligible for the award of **B. Tech. Electronics and Communication Engineering (ECE)** degree of JAMIA HAMDARD.

13. CLASSIFICATION OF SUCCESSFUL CANDIDATES

The result of successful candidates, who fulfill the criteria for the award of **B. Tech. Electronics and Communication Engineering (ECE)**, shall be classified at the end of last semester, on the basis of his/her final CGPA (to be calculated as per university rule).

SYLLABUS
BTECE 101 (APPLIED MATHEMATICS – I)

Unit – I

Complex Numbers and Infinite Series: De Moivre's theorem and roots of complex numbers, Euler's theorem, Logarithmic Functions, Circular, Hyperbolic functions and their inverses, convergence and divergence of Infinite series, Comparison test d'Alembert's ratio test, Higher ratio test, Cauchy's root test, alternating series, Leibnitz test, absolute and conditional convergence.

Unit – II

Calculus of One Variable: Successive differentiation, Leibnitz theorem (without proof) McLaurin's and Taylor's expansion of functions, asymptotes of Cartesian curves, curvature of curves in Cartesian, parametric and polar coordinates, tracing of curves in Cartesian.

Unit – III

Calculus of Several Variables: Partial differentiation, Euler's theorem on homogeneous functions, change of variables, Taylor's theorem of two variables, maxima and minima of two variables, Langranges method of undermined multipliers and Jacobians.

Unit-IV

Linear Algebra (Matrices): Rank of matrix, linear transformations, Hermitian and skew – Hermitian forms, inverse of matrix by elementary operations. consistency of linear simultaneous equations, diagonalisation of a matrix, eigen values and eigen vectors. Caley–Hamilton theorem (without proof).

Unit – V

Integral Calculus: Double integral, change of order of integration, triple integral, change of variables, Beta and gamma functions and relationship between them.

TEXT BOOKS

- Ramana, "Higher Engineering mathematics" ,TMH.
- Kresyzig, E., "Advanced Engineering Mathematics", John Wiley and Sons.

REFERENCE BOOKS

- Mitin, V. V.; Polis, M. P. and Romanov, D. A., "Modern Advanced Mathematics for Engineers", John Wiley and Sons, 2001.
- Dr. A. B. Mathur, V. P. Jaggi "Advanced Engineering Mathematics", Khanna publications.
- Jain, R. K. and Iyengar, S. R. K., "Advanced Engineering Mathematics", Narosa, 2003
- Ramana," Engineering Mathematics", TMH.
- B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.

BTECE 102 (APPLIED PHYSICS – I)

Unit-I

Interference of Light: Interference due to division of wavefront and division of amplitude, Young's double slit expt., Interference, Principle of Superposition, Theory of Biprism, Interference from parallel thin films, wedge shaped films, Newton rings, Michelson interferometer.

Unit-II

Diffraction: Fresnel Diffraction, Diffraction at a straight edge, Fraunhofer diffraction due to N slits, Diffraction grating, absent spectra, dispersive power of Grating, resolving power of prism and grating.

Unit-III

Polarization: Introduction, production of plane polarized light by different methods, Brewster and Malus Laws. Double refraction, Quarter & half wave plate, Nicol prism, specific rotation, Laurent's half shade polarimeter.

Unit-IV

Laser: Introduction, temporal and spatial coherence, principle of Laser, stimulated and spontaneous emission, Einstein's Coefficients, He-Ne Laser, Ruby Laser, Application of Lasers.

Fibre Optics: Introduction, numerical aperture, step index and graded index fibres, attenuation & dispersion mechanism in optical fibers (Qualitative only), application of optical fibres, optical communication (block diagram only)

Unit-V

Mechanics: Central and non-central forces, Inverse square force, SHM, Damped, undamped and forced Oscillations.

Special theory of Relativity: Frame of reference, Michelson-Morley experiment, basic postulates of special relativity, Lorentz transformations (space – time coordinates & velocity only), mass energy relation.

TEXT BOOKS

- A. Ghatak, "Optics" TMH
- N. Subrahmanyam and Brij Lal, "Optics"

REFERENCE BOOKS

- Jenkins and White, "Fundamentals of Optics"
- C. Kittel, "Mechanics", Berkeley Physics Course, Vol.- I.
- A. Beiser, "Concepts of Modern Physics"

BTECE 103 (APPLIED CHEMISTRY)

Unit-I

Water: Analysis of water-alkalinity, hardness and its determination (EDTA method only). Water for domestic use, water softening processes- lime-soda process, ion exchange method, boiler feed water, boiler problems- scale, sludge, priming and foaming, caustic embitterment and corrosion, their causes and prevention, removal of silica, removal of dissolved gases, carbonate and phosphate conditioning, colloidal conditioning. Calgon treatment. Numerical problems on alkalinity, hardness, lime-soda process and ion exchange method, EDTA method.

Unit-II

Fuels: Classification, combustion and chemical principles involved in it, calorific value: gross and net calorific values and their determination by Bomb calorimeter. **Solid Fuels:** Proximate and ultimate analysis of coal and their importance, high and low temperature carbonization. **Liquid Fuels:** Conversion of coal into liquid fuels (Bergius process and Fisher-Tropsch process) and mechanism, Petroleum: its chemical composition and fractional distillation, cracking of heavy oil residues- thermal and catalytic cracking, knocking and chemical structure, octane number and cetane number and their significance. Numerical on calorific value, combustion and ultimate analysis of coal.

Unit-III

Gaseous State: Gas laws and Kinetic theory of gases, real gases- non ideal behaviour, causes of deviation from ideal behaviour, Vander Waal's equation. Numericals based on above topics. **Thermochemistry:** Hess's law, Effect of temperature on heat of reaction at constant pressure (Kirchoff's Equation)

Unit-IV

Catalysis: Criteria for catalysis: Homogeneous catalysis- acid-base, enzymatic catalysis, catalysis by metal salts, Heterogeneous catalysis, concepts of promoters, inhibitors and poisoning, physisorption, chemisorption. **Corrosion:** Types of corrosion (dry, wet, atmospheric and soil corrosion), theories of corrosion, protective measures against corrosion.

Unit-V

Polymers: Functionality, Degree of polymerization, addition and condensation polymerization, linear, branched and cross-linked polymers, tacticity of polymers, Homo and copolymers, thermoplastic, thermosetting polymers, elastomers, Natural polymers.

TEXT BOOKS

- Chemistry in Engineering and Technology (Vol. I and II) (Latest ed.), By J.C. Kuracose and J. Rajaram.
- Environmental Chemistry and Pollution control (Latest ed.), By S.S. Dara.
- J.D. Lee, "Inorganic Chemistry", latest ed.
- Puri, Sharma and Pathania, "Principles of Physical Chemistry", Latest ed.
- V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedha, "Polymer Science", latest ed.
- Engineering Chemistry by Sunita Rattan Katson Books.

BTECE 104 (FUNDAMENTALS OF ELECTRICAL ENGINEERING)

Unit-I

Circuit Analysis: Ohm's Law, KCL, KVL Mesh and Nodal Analysis, Circuit parameters, energy storage aspects, Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer Theorem, Millman's Theorem, Star-Delta Transformation. Application of theorem to the Analysis of dc circuits.

Unit-II

A. C. Circuits: R-L, R-C, R-L-C circuits (series and parallel), Time Constant, Phasor representation, Response of RL, R-C and R-L-C circuit to sinusoidal input Resonance-series and parallel R-L-C Circuits, Q-factor, Bandwidth.

Unit-III

Measuring Instruments: Principles, Construction and application of moving coil, moving iron, dynamometer type, induction type instruments, extension of range of ammeter, voltmeter (shunt and multiplier), Two-wattmeter method, for the measurement of power, Cathod-ray Oscilloscope and Applications.

Unit-IV

Transformers: Construction and Working principles and phasor diagrams of Single-phase Transformer, Emf equation, Equivalent circuit, Regulation and efficiency, and Auto transformer.

Unit-V

Rotating Machines: Construction and working principles of dc motor and generator and its characteristics, Applications of DC machines, Construction and working principles of 3-j- Induction motor, Torque-speed characteristics, and Industrial applications.

TEXT BOOKS

- Vincent DEL TORO "Electrical Engineering Fundamental's Prentice Hall India", Ed 2002.
- D.P. Kothari & L.J. Nagrath, "Basic Electrical Engineering", TMH.
- B L Thareja, "Basic Electrical and Electronics"

REFERENCE BOOKS

- P.C. Sen "Principles of Electric Machines and Power Electronics", Wiley Eastern 2003.
- Basic Electrical Engineering. "Mittle/Mittal" TMH.
- A.K.Sawhney, Electrical & Electronics Measurement & Instrumentation, Hanpat Rai & Sons, India.

BTECE 105 (INTRODUCTION TO COMPUTER PROGRAMMING)

Unit-I

Introduction to Programming: Concept of algorithms, Flow Charts, Programming using C: Concept of variables, program statements and library functions, data types, int, char, float etc., expressions, arithmetic operation, relational and logic operations, assignment statements, extension of assignment of the operations. C primitive input output using getchar and putchar, scanf and printf functions

Unit-II

Conditional Statements and Iterations: conditional executing using if, else, switch and break statements, Concept of loops, for, while and do-while, continue. One dimensional arrays and 2-d arrays and Use in matrix computations.

Unit-III

Subprograms: Concept of Sub-programming, functions Example of functions. Argument passing.

Unit-IV

Pointers and Strings: Pointers, relationship between arrays and pointers, Argument passing using pointers, Array of pointers, Passing arrays as arguments. Strings and C string library.

Unit-V

Structures and File Handling: Structure and Unions. Defining C structures, Programming examples. File handling in C

TEXT BOOKS

- Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.
- Herbert Schildt, "C: The complete reference", Osbourne Mcgraw Hill, 4th Edition, 2002.

REFERENCE BOOKS

- Raja Raman, "Computer Programming in C", Prentice Hall of India, 1995.
- Kernighan & Ritchie, "C Programming Language", The (ANSI C Version), PHI, 2nd Edition.

BTECE 106 (COMMUNICATION SKILLS-I)

Unit-I

The Sentence: Sentence formation, Types of Sentences (Declarative , Interrogative, Imperative, Exclamatory, simple, Compound and Complex Sentences), Use of Connectives in Complex and Compound sentences, Agreement of Subject and Verb.

Unit-II

Parts of Speech: Noun, Pronouns, Verb (Verbs classified according to form and types of Verbs), Adjectives and their Usage in Daily Life, Adverbs (type, position and functions of Adverbs), Prepositions , Conjunctions , Interjections, errors of accident and syntax with reference to Parts of Speech, Articles.

Unit-III

Tenses, Narration and Voice: __Descriptive study of Tenses, real life usage of Tenses, Active and Passive Voice, Conversion of Active voice into Passive voice, Direct speech, Reported speech, Conversion of Direct speech into Indirect speech.

Unit-IV

Vocabulary Usage and Technical Writing: Word Formation (by adding suffixes and prefixes), Synonyms, Antonyms, Homophones and Homonyms, One Word Substitutions, Confusing Words, Common Differences between British English and American English, Punctuation, Letter Writing, Paragraph and Essay writing, Interpretation and Use of Charts, Graphs and Tables in technical writing , Comprehension of Unseen Paragraphs.

Unit-V

Text: English for Students of Science by A.Roy and P.L. Sharma (Orient Longman)

Chapters for Study:

- i) "The year 2050" by Theodore J. Gordon.
- ii) "The Mushroom of Death" by A. Bandhopadhyay.
- iii) ' Human Environment" by Indira Gandhi.
- iv) The Adventure of Blue Carbuncle By Arthur Conan Doyle

TEXT BOOKS

- Maison, Margaret M. Examine Your English, Hyderabad: Orient Longman, 1980.
- Sharma, R.S. Technical Writing. Delhi: Radha Publication, 1999.
- Sudarsanam, R. Understanding Technical English. Delhi: Sterling Publishers Pvt. Ltd.,1992
- Roy, A. and Sharma P.L., English for Students of Science , Orient Longman, 2008.

BTECE 201 (APPLIED MATHEMATICS – II)

Unit – I

Ordinary Differential Equation: First order differential equations – exact and reducible to exact form, linear differential equations of higher order with constant coefficients, solution of simultaneous differential equations, Variation of parameters, solution of homogeneous differential equations – Cauchy and Legendre forms.

Unit – II

Functions of Complex Variables: Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions, Limit and Continuity of a function, Differentiability and Analyticity, Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, Harmonic functions, Power series, radius and circle of convergence.

Unit – III

Complex Integration: Complex line integral, Cauchy's integral theorem, Cauchy's integral formula, zeros and singularities, Taylor series, Laurents series, calculation of residues, residue theorem, evaluation and real integrals.

Unit – IV

Laplace Transformation: Existence condition, Laplace transform of standard functions, Properties, Inverse Laplace transform of functions using partial fractions, Convolution and convolution theorem, Unit step function and Periodic function and their transforms.

Unit – V

Application Of Laplace Transformation: Laplace transforms of Dirac delta function, application to ordinary linear differential equations with constant coefficient, L-R circuit, L-C-R circuit, mass spring system and simultaneous differential equations.

TEXT BOOKS

- Ramana, "Higher Engineering mathematics" ,TMH.
- Kresyzig, E., "Advanced Engineering Mathematics", John Wiley and Sons.

REFERENCE BOOKS

- Mitin, V. V.; Polis, M. P. and Romanov, D. A., "Modern Advanced Mathematics for Engineers", John Wiley and Sons, 2001.
- Dr. A. B. Mathur, V. P. Jaggi "Advanced Engineering Mathematics", Khanna publications.
- Jain, R. K. and Iyengar, S. R. K., "Advanced Engineering Mathematics", Narosa, 2003
- Ramana," Engineering Mathematics", TMH.
- B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.

BTECE 202 (APPLIED PHYSICS-II)

Unit-I

Electromagnetic Theory (EMT): Motion of Charged Particles in crossed electric & magnetic fields, Velocity Selector & Magnetic focussing, Gauss law, continuity equation, inconsistency in Ampere's Law, Maxwell's equations (differential and integral forms), Poynting vector, Poynting Theorem (Statement only), propagation of plane electromagnetic waves in conducting and non-conducting medium.

Unit-II

Quantum Mechanics & Statistical Physics: De-Broglie Hypothesis, Davisson Germer experiment, wave function and its properties, expectation value, Wave Packet, Uncertainty principle. Schrodinger Equation for free Particle, Time Dependent Schrodinger Equation, Particle in a box (1-D), Single step Barrier, Tunneling effect. Qualitative Features of Maxwell Boltzman, Bose-Einstein and Fermi-Dirac statistics distribution, functions & their comparison (no derivation)

Unit-III

Solid State Physics: Formation of energy bands in metals, semiconductors and insulators; intrinsic and extrinsic semiconductors, Fermi energy levels for doped, undoped semiconductors and pn junction; Tunnel diode, Zener diode.

Unit-IV

Superconductivity: Meissner Effect, Type I and Type II Superconductors, BCS theory (Qualitative only), London's equation, properties of superconductors & applications.

Unit-V

X-Rays: production and properties, Crystalline and Anorphous solids (Brief) Bragg's Law, Applications. **Ultrasonics:** Introduction, Production of Ultrasonics (Magnetostriction and piezoelectric methods), engineering applications.

TEXT BOOKS

- Concept of Modern Physics : A. BEISER
- Atomic Physics : Rajam
- Greiner : Quantum Physics
- Griffth : Introduction to Electrodynamics

REFERENCE BOOKS

- Electromagnetic waves and Radiating Systems :Jordan & Balmain
- Solid State Physics : Kittel
- Solid State Physics : R.L. Singhal
- Quantum Mechanics :Schiff

BTECE 203 (ENGINEERING MECHANICS)

Unit-I

Force Systems: Moment of a force about a point and about an axis; couple moment; reduction of a force system to a force and a couple. Equilibrium : Free body diagram; equations of equilibrium; problems in two and three dimensions; plane frames and trusses.

Unit-II

Friction: Laws of Coulomb friction., problems involving large and small contact surfaces; square threaded screws;belt friction; rolling resistance. Kinematics and Kinetics of particles : Particle dynamics in rectangular coordinates cylindrical coordinates and in terms of path variables; central force motion.

Unit-III

Properties of Areas: Moments of inertia and product of inertia of areas, polar moment of inertia, principal axes and principal moments of inertia. Concept of stress and strain : Normal stress, shear stress, state of stress at a point, ultimate strength, allowable stress, factor of safety; normal strain, shear strain, Hooke's law, Poisson's ratio, generalized Hooke's law; analysis of axially loaded members.

Unit-IV

Torsion: Torsion of cylindrical bars, torsional stress, modulus of rigidity and deformation. Flexural loading : Shear and moment in beams; load, shear and moment relationship; shear and moment diagrams; flexure formula; shear stress in beams; differential equation of the elastic curve, deflection of beams.

Unit-V

Transformation of Stress and Strain: Transformation of stress and strain, principal stresses, principal strains, Mohr's circle for stress and strain. Combined loading : Axial and torsional; axial and bending; axial, torsional and bending. Column : Buckling of slender columns, Euler buckling load for different end conditions.

TEXT BOOKS

- A.K.Tayal, "Engg Mechanics", Umesh Publications
- Sadhu Singh, "Engg Mechanics", Khanna Publishers

REFERENCE BOOKS

- Irving H. Shames, "Engg Mechanics", PHI publications
- U.C.Jindal, "Engg Mechanics", Galgotia Publications
- "S Timoshenko, DH Young & JV Rao" Engineering Mechanics TMH.
- Subramanyam, "Engg Mechanics"
- K L Kumar, "Engineering Mechanics", TMH

BTECE 204 (BASICS OF ELECTRONICS)

Unit-I

Physics Of Semiconductor : Review of Bohr's Atomic theory, elementary concept of energy levels in atoms, energy bands in solids, energy band diagram on the Basis of conductivity, Intrinsic semi-conductor: Crystal structure, conduction in intrinsic semiconductor at absolute zero Generation of charge carries & their movement in the crystal, conduction of current and current types.

Unit-II

Extrinsic semiconductor: Doping, formation of P-type and N-type semiconductors and their crystal structures, charge carriers in N-type & P-type semiconductors, effects of temperature on extrinsic semiconductors.

Unit-III

Junctions Diodes: Formation of PN junction diode, PN, junction with no external voltage and formation of depletion layer, Barrier potential, width and height of barrier, Biasing of PN junctions, Effects of forward & reverse bias, reverse break down (Avalanche's and Zener effect). V-I characteristic of diode, Ideal diode basic characteristic DC, AC resistance, Draft and diffusion current reverse recovery time. Load line, operating point resistance, diode equivalent circuits. Special Diodes: Operation & characteristic of LED, Photodiode, vector diode schottky diode, tunnel diode, zener diode, and its application as a voltage regular Introduction to vacuum tubes.

Unit-IV

Rectifiers: Concept of rectification, specification of a rectifier diode. Half wave, full wave, bridge rectifier circuits and their operations. Calculations of dc voltage, rms voltage, ripple factor and rectification efficiency of half-wave & full- wave rectifiers zener Diode as Voltage stabilizer. Numerical problems.

Unit-V

Wave Shaping Circuits: Concept of filtering and filter circuits (shunt capacitor filter, choke input filter, RC & LC- π filter) for smoothing output of rectifiers. Concept of clipping clamping –circuits and their operation.

TEXT BOOKS

- Basic Electronics & Linear Circuits by N.N. Bhargava
- Principles of Electronics by V.K. Mehta.

REFERENCE BOOKS

- Microelectronics by Millman & Grabel, Tata McGraw Hill
- R. Boylestad and L. Nashelsky, "Electronics Devices and Circuits", Prentice Hall
- S. Sedra, K.C. Smith, " Microelectronic Circuits," Oxford Univ Press.

BTECE 205 (COMMUNICATION SKILLS – II)

Unit-I

BASIC CONCEPTS IN COMMUNICATION: Communication as sharing; context of communication; the speaker/writer and the listener/reader; medium of communication; barriers to communication; accuracy, brevity, clarity and appropriateness in communication.

Unit-II

WRITING SKILLS: Types of writings (Expository, Descriptive, Analytic, Argumentative, Narrative etc) and their main features. Resumes and CV's and Cover letters. Memos and Notices. Basics of Formal Reports.

Unit-III

VERBAL, NON-VERBAL AND LISTENING SKILLS: Elementary Phonetics (Speech Mechanism, The Description of Speech Sounds, The Phoneme, the syllable; Prosodic Features, Word Accent, Features of Connected Speech); Paralanguage and Body language; and Classroom Presentations, Hearing and Listening; Essentials of Good Listening: Achieving ability to comprehend material delivered at relatively fast speed.

Unit-IV

GROUP DISCUSSION: Use of persuasive strategies including some rhetorical devices for emphasizing (for instance; being polite and firm; handling questions and taking in criticism of self; turn-taking strategies and effective intervention; use of body language).

TEXTBOOKS

- Bansal, R.K. and J. B. Harrison. *Spoken English For India: A Manual of Speech and Phonetics*, Hyderabad: Orient Longman, 1983.
- Lewis, Hedwig, *Body Language: A Guide For Professionals*, New Delhi: Response Books (A division of Sage Publication), 2000

REFERENCE BOOKS

- Sides, Charles H. *How to Write & Present Technical Information*. Cambridge: CUP, 1999.
- Forsyth, Sandy & Lesley Hutchison. *Practical Composition*. Edinburgh : Oliver & Boyd, 1981

BTECE ES (ENVIRONMENTAL STUDIES)

Unit-I

INTRODUCTION: components of the environment, environmental degradation. Ecology-Elements of Ecology: Ecological balance and consequences of change, principles of environmental impact assessment.

Unit-II

AIR POLLUTION AND CONTROL: Atmospheric composition, energy balance, climate, weather, dispersion, sources and effects of pollutants, primary and secondary pollutants, green house effect, depletion of ozone layer, standards and control measures

Unit-III

WATER POLLUTION AND CONTROL: Hydrosphere, natural water, pollutants their origin and effects, river, lake/ground water pollution, standards and control.

Unit-IV

LAND POLLUTION: Lithosphere, pollutants (municipal, industrial, commercial, agricultural, hazardous solid wastes): their origin and effects, collection and disposal of solid waste, recovery and conversion methods.

Unit-V

NOISE POLLUTION: Sources, effects, standards and control.

TEXTBOOKS

- Masters, G.M., *Introduction to Environmental Engineering and Science*, Prentice Hall of India Pvt. Ltd., 1991.
- Nebel. B J . , *Environmental Science*, Prentice-Hall Inc., 1987.
- Odum EP, *Ecology: The Link between the natural and social sciences*, IBH Publishing Com. Delhi

BTECE 301 (APPLIED MATHEMATICS – III)

Unit - I

FOURIER SERIES: Fourier Series, Euler's formulae, fundamental theorem of Fourier series (Convergence theorem), having arbitrary periods, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, periodic block function, half range sine and cosine expansion, Fourier transform, sine and cosine transforms, shifting theorem.

Unit – II

SPECIAL FUNCTIONS: Bessels functions of first kind, Recurrence relations, modified Bessel functions of first kind, Ber and Be functions, Legendre Polynomial, Rodrigue's formula, orthogonal expansion of function.

Unit - III

VECTOR CALCULUS: Scalar and Vector point functions, Gradient, Divergence, Curl with geometrical physical interpretations, Directional: derivatives, Properties. Line integrals and application to work done, Green's Lemma, Surface integrals and Volume integrals, Stoke's theorem and Gauss divergence theorem (both without proof).

Unit -IV

PARTIAL DIFFERENTIAL EQUATION: Formation of first and second order linear, Lagrange's linear partial differential equation, first order non-linear partial differential equation, Charpit's method, method of separation of variables equations, Laplace, wave and heat conduction equation.

Unit -V

PROBABILITY AND STATISTICS: Conditional Probability; Mean, Median, Mode and Standard Deviation; Random variables; Distributions, Poisson, Binomial, Normal.

TEXT BOOKS

- Ramana, "Higher Engineering mathematics" ,TMH.
- Kresyzig, E., "Advanced Engineering Mathematics", John Wiley and Sons.

REFERENCE BOOKS

- Mitin, V. V.; Polis, M. P. and Romanov, D. A., "Modern Advanced Mathematics for Engineers", John Wiley and Sons, 2001.
- Dr. A. B. Mathur, V. P. Jaggi "Advanced Engineering Mathematics", Khanna publications.
- Jain, R. K. and Iyengar, S. R. K., "Advanced Engineering Mathematics", Narosa, 2003
- Ramana," Engineering Mathematics", TMH.
- B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.

BTECE 302 (ANALOG ELECTRONICS)

Unit-I

Review of diodes and its applications: p-n junction diode modelling, depletion and diffusion capacitance, breakdown in diodes, rectifier circuit, zener diode, voltage regulation by zener diode, clipper and clamper circuits.

Unit-II

BJT (Bipolar Junction Transistor): physical structure and modes of operation, need for stabilisation, fixed bias, emitter bias, self bias, voltage divider bias, stability with respect to variation in I_{CO} , V_{BE} & β .

Small signal amplifier: CB, CE, CC configuration, hybrid model for transistor for low frequencies, RC coupled amplifier.

Unit-III

Multistage amplifier: Cascade and cascode amplifier, gain, impedance and bandwidth of multistage amplifier, feedback in amplifier: classification, properties of negative feedback in amplifier, introduction to class A, B, C, AB amplifiers.

Unit-IV

FET: JFET physical structure, biasing, small signal JFET equivalent circuit, single stage basic JFET amplifier configuration (CD, CG and CS), introduction and physical structure of MOSFET.

Unit-V

Oscillator: Principle of oscillation, Hartley, Colpitts, Wien bridge, Phase shift oscillator, crystal oscillator, introduction to astable, monostable, bistable oscillator.

TEXT BOOKS

- Boylstad & Nashelsky, " Electronics Devices and Circuit theory ", Pearson publisher.
- Sedra, Smith, " Microelectronic circuits", oxford university perss.

REFERENCE BOOKS

- V.K.Mehta, Rohit Mehta," Principles of electronics", S.Chand publisher.
- B.Kumar, Shail Bala Jain," Electronic Devices and circuit" PHI publication.
- N.N.Bhargwa, " Basic Electronics", TTTI, Chandigarh, publisher.

BTECE 303 (DIGITAL ELECTRONICS)

Unit-I

Introduction to number system: binary, octal, decimal, hexa decimal, conversion between these number systems, BCD (Binary Coded Decimal) code, Gray code, Excess-3 code, 1's and 2's complement, introduction to logic gates, universal gates.

Unit-II

Boolean Algebra and combinational circuits: Boolean Algebra, minimisation of Boolean function using K-map, Conversion of binary codes and its associated logic circuits, combinational circuits: half adder, full adder, half subtractor, multiplexer, Demultiplexer, encoder, decoder, comparator circuits.

Unit-III

Sequential circuits: flip-flop and latches, SR , JK, T, D flip-flop and latches, race around condition in latches, conversion of flip-flop.

Logic families: NOT, NAND, NOR, AND and OR CMOS logic gate.

Unit-IV

Counter and shift register: Design of synchronous and asynchronous counter, binary, BCD, decade, Up/Down counter, left shift register, right shift register, universal register.

Unit-V

Semiconductor memories: RAM, ROM, EPROM, EEPROM, dynamic and static RAM, programmable memories: PLA and PAL.

TEXT BOOKS

- M.Morris Mano, M.D.Cilleti, " Digital Design", Pearson publication.
- R.P.jain, " Modern Digital Electronics", Mc Graw Hill publication.

REFERENCE BOOKS

- A.Anand Kumar, " Fundamentals of Digital logic Circuits", PHI publication.
- " Digital principles & Applications", Malvino and Leach, TMH Publication.

BTECE 304 (SIGNALS AND SYSTEMS)

Unit-I

Signals: Classification of signals, continuous and discrete time signal, even and odd signal, periodic and non-periodic signal, energy and power signal, elementary signals: impulse, unit step, exponential (real and complex) signals, ramp signal, transformation of independent variable of signal: time scaling, time shifting, amplitude scaling.

Unit-II

Fourier transform: properties of the continuous time and discrete time Fourier transform (DTFT), magnitude and phase representation of LTI (Linear Time Invariant) system.

Unit-III

Laplace Transform: properties of Laplace Transform, ROC (Region of Convergence) and its properties, Inverse Laplace Transform.

Unit-IV

Z-transform: Properties of Z-transform, ROC (Region of Convergence) and its properties, Inverse Z-transform, relationship between Z-transform, Laplace transform and Fourier transform.

Unit-V

Systems: classification of system, LTI (Linear Time Invariant) system, continuous and discrete time LTI system, Properties of LTI system, impulse response of LTI system, convolution integral for continuous time LTI system, Convolution sum for discrete time LTI system.

TEXT BOOKS

- “Signals and Systems”, Oppenheim, Willsky and Nawab, Pearson Publication.
- “Signals and Systems”, Tarun Kumar Rawat, Oxford University Press.

REFERENCE BOOKS

- “Signals and Systems”, Simon Haykins, PHI publication
- “Signals and Systems”, Ramesh Babu, R.Anandanatrajan, Scitech publication
- “Linear Systems and Signals”, B.P.Lathi, Oxford university press.

BTECE 305 (ELECTRONICS INSTRUMENTATION & MEASUREMENT)

Unit-I

Introduction to static and dynamic characteristics of instruments, study of errors in measurement, types of static error, gross error, systematic error, random error and their source
Introduction of moving coil and moving iron type instruments, electrical standard and calibration.

Unit-II

Operation and construction of Galvanometer (DC and AC) Ammeter and Voltmeter, Multirange Ammeter and Voltmeter, Digital Voltmeter, Digital Mutimeter, Digital frequency meter.

Unit-III

Measurement of resistance, inductance and capacitance, measurement of low medium and high resistance, measurement of insulation resistance, measurement of AC bridge for inductance and capacitance, introduction to instrument transformer.

Unit-IV

Introduction to CRO, basic principles and block diagram understanding of single/dual beam CRO, delay time based oscilloscope, sampling oscilloscope, Digital storage oscilloscope (DSO) and their application.

Unit-V

Fixed/variable frequency audio oscillator, function generator (sine, square, triangular), introduction to digital data recording system.

TEXT BOOKS

- David A. Bell "Electronic instrumentation and measurement", PHI publication.
- H.S.Kalsi " Electronic instrumentation", TMH publication.

REFERENCE BOOKS

- Reissland, M.U. "Electrical measurement: fundamentals, concept, application", new age international (P) ltd. Publishers.
- W.D.Cooper, " modern electronics instrumentation and measurement technique", PHI publishers.
- A.K.Shawney," Electrical and electronics measurement and instruments" Dhanpatrai & Sons publication.

BTECE 401 (ANALOG INTEGRATED CIRCUITS)

UNIT-I

Operational Amplifier: The ideal Op-amp, Analysis of inverting and non-inverting configurations using ideal Op-amp, effect of open loop gain on circuit performance, Frequency response, summer, subtractor, differentiator, integrator.

UNIT-II

Logarithmic Amplifiers, Log/Antilog Modules, Precision Rectifier, Peak Detector, Sample and Hold Circuits. OP-AMP as Comparator, Schmitt Trigger, Square and Triangular Wave Generator, Monostable Multivibrator. IC Analog Multiplier applications.

UNIT-III

Introduction to filtering: Frequency response, Characteristics and terminology, Active versus passive filters Low pass filter: First order low pass active filter, second order active filter model, second order low pass filter characteristics, High pass active filter. Band pass active filter.

UNIT-IV

Feedback: Properties of feedback amplifiers, basic feedback topologies, analysis and characteristics of various feedback amplifier circuits. Loop gain, stability problem, effect feedback on the amplifier poles, stability study using bode plots, frequency compensation.

UNIT-V

IC timer 555, basic operational modes, astable, mono stable modes, VCO, IC PLL and their applications, IC function generators, analog multiplexers and their applications.

TEXT BOOKS

- Sedra and Smith, "Microelectronic Circuits", Oxford University press, 5th Edition, 2005.
- Applications and Design with Analog Integrated Circuits, J. Michel Jacob, PHI

REFERENCE BOOKS

- B.P. Singh and Rekha Singh, "Electronic Devices and Integrated Circuits"; Pearson Education, 1st Edition 2006.
- "Design of analog CMOS Integrated circuits" by Behzad Razavi; Tata McGraw Hill
- "Microelectronics" by Millman and Halket; Tata McGraw Hill.

BTECE 402 (DIGITAL SYSTEM DESIGN)

UNIT-I

Introduction to digital system design using VHDL.

UNIT II

Introduction to finite state machine: pulse and fundamental mode of operation, realization of state table from verbal description, state diagram & Transition matrix, Mealy and Moore model.

UNIT III

Reduction of flow tables of completely and incompletely specified sequential machines, concept of secondary state assignment and realization of circuits of FSM (Finite State Machine).

UNIT IV

Decomposition of FSM & composite machine equivalence between Mealy and Moore model machine. Race and Hazard problems with asynchronous sequential machine.

UNIT V

Introduction to design with the programmable modules: ROM, PAL circuits. Introduction to CPLD & FPGA.

TEXT BOOKS

- “Digital Design” by M.M. Mano; Pearson Edition.
- “Digital Logic State Machine Design” by D.J. Comer; Oxford University Press.
- “Introduction To Digital Systems” by M.Ercegovac, T. Lang and J.H.Morcno; Wiley Int.

REFERENCE BOOKS

- “A Verilog HDL Primer” by J.Bhaskar; BS Publication.
- “Verilog Digital Systems Design” by Z. Navabi; Tata McGraw Hill.
- “Fundamental of Logic Design” by Roth ; Cengage learning.
- Advanced Digital design with Verilog HDL by Michael D Ciletti

BTECE 403 (ELECTROMAGNETIC THEORY)

UNIT-I

Review of Vector analysis, Rectangular, Cylindrical and Spherical coordinates and their transformation. Divergence, gradient and curl in different coordinate systems. Electric field intensity, Electric Flux density, Energy and potential.

UNIT-II

Current and conductors, Dielectrics and capacitance, Poisson's and Laplace's equation.

UNIT-III

Steady magnetic field, magnetic forces, materials and inductance, Time varying field and Maxwell's equation.

UNIT-IV

Uniform plane waves, Plane wave reflection and dispersion, transmission line parameter and equations.

UNIT-V

Waveguides: Rectangular waveguides, Transverse Magnetic modes, Transverse Electric modes, Wave propagation in the guide, Power transmission and attenuation, Waveguide current and mode excitation, Waveguide resonators.

TEXT BOOKS

- Hayt, W.H. and Buck, J.A. 'Engineering Electromagnetics Tata McGraw Hill Publishing Co. Ltd., New Delhi Seventh edition.

REFERENCE BOOKS

- Jordan E.C. and Balmain K.G. 'Electromagnetic' wave and radiating systems. PHI Second edition.
- Kraus, R. 'Electromagnetics' Tata McGraw Hill Fifth edition.
- Elements of electromagnetic by M.N.O.Sadiku, Oxford university press.

BTECE 404 (COMMUNICATION SYSTEMS)

UNIT-I

Overview of communication system, Analog modulation: Need of modulation, Amplitude modulation, generation and demodulation of DSB-FC, DSB-SC, generation and demodulation of SSB, analysis of power in DSB-FC, DSB-SC, SSB.

UNIT-II

Angle modulation: Frequency and Phase modulation, narrow and wideband FM, bandwidth of an FM wave, generation and demodulation of FM wave, comparison between AM, FM and PM.

UNIT-III

Radio and television broadcast: AM radio broadcasting, FM radio broadcasting, TV broadcasting, function and classification of radio receiver, TRF receiver, super heterodyne receiver, basic elements, receiver characteristics, frequency mixture, AGC characteristics.

UNIT-IV

Pulse modulation: Pulse code modulation, signal to quantization noise ratio, companding, probability of error in PCM, DPCM, DM, ADM modulators and demodulators, line coding, inter symbol interference, introduction to ASK, FSK, PSK modulation system.

UNIT-V

Introduction to noise in communication system, external and internal noise, thermal noise, shot noise, white noise, noise equivalent bandwidth, noise figure and noise temperature.

TEXT BOOKS

- “Communication System” by Simon Haykin; John Wiley & sons.

REFERENCE BOOKS

- “Principles of Communication System” by Taub & Schilling; TMH.
- “Communication Systems” by Proakis; John Wiley & sons.

BTECE 405 (COMPUTER ARCHITECTURE)

UNIT-I

Register transfer and micro operations: Register Transfer, Memory Transfer, Arithmetic and logic Micro operations, Design of ALU.

UNIT II

Instruction Codes, Computer Registers, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Timing & Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupt related instruction cycle, Design of Hardwired and Microprogram Control unit, Microprogramming,

UNIT III

Input – Output Organization: Peripheral devices, Input – Output interface, Asynchronous Data Transfer, Modes of Data Transfer, Priority Interrupt, Direct Memory Access, serial communication, UART.

UNIT IV

Memory: Memory hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware, High speed memories.

UNIT V

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating Point Arithmetic Operation, Decimal Arithmetic Unit, Decimal Arithmetic Operations. Hardware implementation of Hardware algorithms.

TEXT BOOKS

- “Computer System and Architecture” by PHI, Mano M.
- “Computer Organization & Architecture”, by Stallings, W; PHI.

REFERENCE BOOKS

- “Computer Organization & Design” by Pal Chaudhuri, P; PHI.
- “Parallel Processing and Architecture”, by K.Hwang and F.Briggs; McGraw Hill, 1984.
- “Computer Architecture: A Quantitative Approach” by D. Patterson and J. Hennessy, Second Edition; Morgan.

BTECE 406 (NETWORK ANALYSIS AND SYNTHESIS)

Unit-I

Review of signal systems and network elements: KCL and KVL, Network Theorems: Superposition theorem, Thevenian Theorem, Nortons theorem, maximum power transfer theorem.

Unit-II

Analysis of RLC circuit: Initial and final condition of RLC circuits, impulse and step response of inductive, capacitive circuits, transient and steady state response of RLC circuits, solution of network equation.

Unit-III

Laplace transform: properties of Laplace transform, inverse Laplace transform, Application of Laplace transform in network analysis for RLC circuits.

Unit-IV

2-port network: 2-port network parameters, z-parameter, y-parameter, h-parameter, g-parameter, ABCD parameter, inter conversion of 2- port network parameters.

Unit-V

Network synthesis: driving point and transfer function, Hurwitz polynomial, positive real function, synthesis of RC, RL, LC network in Foster I and II form, Caur I and II forms.

TEXT BOOKS

- Kuo, " Network Analysis and Synthesis", John Wiley and sons publications.
- D.R.Chaudhary," Network and Systems", New age international.

REFERENCE BOOKS

- Valkenburg," Network Analysis", PHI publisher.
- Hayt ," Engineering circuits and analysis", TMH publication
- Behrouz peikari, "Fundamentals of Network Analysis and synthesis", Jaico Publishing house.

BTECE 501 (INFORMATION THEORY AND CODING)

Unit-I

INFORMATION MEASURE AND ENTROPY: Introduction, Measure of information, Average information content of symbols in long independent Sequences, Average information content of symbols in long dependent Sequences, Mark-off statistical model for information source, Entropy and information rate of mark-off source.

SOURCE CODING: Encoding of the source output, Shannon's encoding algorithm, Communication Channels, Discrete communication channels.

Unit-II

SOURCE CODING THEOREM: Huffman coding, Discrete memory less Channels, Mutual information, Channel Capacity.

CONTINUOUS CHANNEL: Differential entropy and mutual information for continuous Ensembles, Channel capacity Theorem.

Unit-III

INTRODUCTION TO ERROR CONTROL CODING: Types of errors, Types of codes, Linear Block Codes: Matrix description. Error detection and correction, Standard arrays and table look up for decoding, Hamming Codes.

Unit-IV

CYCLIC CODES: Binary Cyclic Codes, Algebraic structures of cyclic codes, Encoding using (n-k) bit shift register, Syndrome calculation, BCH codes.

RS AND GOLAY CODES: Golay codes and Shortened cyclic codes R S codes, Burst error correcting codes, Burst and Random Error correcting codes.

Unit-V

CONVOLUTION CODES: Convolution Codes, Time domain approach, Transform domain approach.

TEXTBOOKS

- K. Sam Shanmugam, *Digital and analog communication systems*, John Wiley.
- Simon Haykin, *Digital communication*, John Wiley.

REFERENCE BOOKS

- Ranjan Bose, *ITC and Cryptography*, TMH.
- Thomas M. Cover & Joy A. Thomas, *Elements of Information Theory*, 2nd Edition, Wiley Publication.
- Roberto Togneri & Christopher J. S deSilva, *Fundamentals of Information Theory and Coding Design*, CRC Press.

BTECE 502(DIGITAL SIGNAL PROCESSING)

UNIT-I

Discrete time signals and systems: characterization & classification of signals and systems, typical signal processing operations and applications, discrete time systems, time domain characterization of LTI discrete time systems.

UNIT-II

Frequency Domain Sampling: The Discrete Fourier Transform, Properties of the DFT, Linear filtering methods based of the DFT.

Efficient computation of the DFT: Principal Of FFT, Fast Fourier Transform Algorithms, Applications of FFT Algorithms, A linear filtering approach to computation of the DFT. Application of DFT, Design of Notch filter

UNIT-III

Basic IIR Filter Structures: Direct forms (I & II), cascade and parallel realizations. Signal flow graph, Transposed structure, Basic FIR filter structures-. Direct form structure, frequency sampling structure, Lattice structure, Linear phase FIR structure . FIR structures.

UNIT-IV

Symmetric and Anti-symmetric FIR Filters, Design of Linear-Phase FIR Filters Using Windows, Design of Linear-Phase FIR Filters by the Frequency Sampling Method, Design of FIR, Equiripple filter design Differentiators.

UNIT-V

Design of IIR Filters From Analog Filters: IIR Filter Design by Approximation of Derivatives, IIR Filter Design by Impulse Invariance. IIR Filter Design by the Bilinear Transformation. The Matched-z Transformation, Characteristics of Commonly Used Analog Filters. Application of above technique to the design of Butterworth & Chebyshev filters.

TEXT BOOKS

- Proakis, J.G. & Manolakis, D.G., "Digital Signal Processing: Principles Algorithms and Applications", Prentice Hall (India).
- Sanjit K. Mitra, "Digital Signal Processing", Third Edition, TMH, 2005

REFERENCE BOOKS

- Oppenheim A.V. & Schafer, Ronald W., "Digital Signal Processing", Pearson Education.
- Rabiner, L.R. and Gold B., "Theory and applications of DSP", PHI.
- DeFatta, D.J., Lucas, J.G. & Hodgkiss, W.S., "Digital Signal Processing", John Wiley & Sons

BTECE 503(ANTENNA AND WAVE PROPAGATION)

UNIT-I

Antenna Principles: Potential Functions & Electromagnetic Field, Current Elements, Radiation from Monopole & Half Wave Dipole, power radiated by current element, radiation resistance. Antenna Gain, Effective Area, Antenna Terminal Impedance, Practical Antennas and Methods of Excitation, Antenna Temperature and Signal to Noise Ratio.

UNIT-II

Radiation Pattern of Antenna- E-plane and H-plane pattern, three dimensional pattern. Power pattern of antenna. Classification of antenna based on pattern. Beam solid angle of antenna.

UNIT III

Antenna directivity, Antenna gain, Antenna efficiency, Effective length and aperture of antenna. Beamwidth and bandwidth of antenna, Antenna polarization.

UNIT-IV

Types of antenna, Travelling wave antenna: long wire, V antenna, rhombic antenna. **Broadband antenna:** helical antenna, Yagi-Uda antenna. **Frequency independent antenna:** log periodic antenna. Introduction of Microstrip patch antenna (MPA), basic characteristics, feeding method, microstrip rectangular patch antenna and its design using transmission line model, smart antennas

UNIT-V

Wave propagation: Ground wave, sky wave, space wave, ionosphere, reflection and refraction by ionosphere, critical frequency, virtual height, MUF (max. usable frequency), skip distance, troposphere and duct propagation.

Antenna measurements: Measurement of reflection coefficient and radiation pattern, Introduction of Anechoic chamber and Vector Network Analyzer.

TEXT BOOKS

- Edward Conrad Jordan, Keith George Balmain, Electromagnetic waves and radiating systems, Prentice Hall, 1968
- J.D. Kraus, R.J. Marhefka and Ahmad S. Khan, "Antennas and Wave Propagation" Tata Mcgraw Hill publications, New Delhi, 4th ed., (Special Indian Edition), 2010.
- Constantine A. Balanis, " Antenna Theory Analysis and Design", 3rd Edition, Wiley Publications.

REFERENCE BOOKS

- S. Das and A. Das, "Antennas and Wave Propagation", Tata Mcgraw Hill publications.
- A.R. Harish and M. Sachidananda, "Antenna and wave Propagation", Oxford Publications.
- G.S.N.Raju, Antenna Wave Propagation, Pearson Education, 2004

BTECE 504 (DIGITAL COMMUNICATION)

UNIT-I

Analog Pulse Modulation: Sampling theorem for band pass signals, Pulse Amplitude modulation: generation and demodulation, PAM/TDM system, PPM generation and demodulation, PWM, Spectra of Pulse modulated signals, SNR calculations for pulse modulation systems.

UNIT II

Waveform coding: quantization, PCM, DPCM, Delta modulation, Adaptive delta modulation- Design of typical systems and performance analysis.

UNIT III

Pulse Shaping, Nyquist criterion for zero ISI, Signalling with duobinary pulses, Eye diagram, Equalizer, Scrambling and descrambling.

UNIT-IV

Digital Modulation Techniques: Gram-Schmidt Orthogonalization Procedure, Types of Digital Modulation, Wave forms for Amplitude, Frequency and Phase Shift Keying, Method of Generation and Detection of Coherent & Non-Coherent Binary ASK, FSK & PSK Differential Phase Shift Keying, Quadrature Modulation Techniques QPSK, Probability of Error and Comparison of Various Digital Modulation Techniques.

UNIT-V

Digital Multiplexing: Fundamentals of Time Division Multiplexing, Electronic Commutator, Bit, Byte Interleaving T1 Carrier System, Synchronization and Signaling of T1, TDM, PCM Hierarchy, T1 to T4 PCM TDM System (DS1 to DS4 Signals).

TEXT BOOKS

- “Communication Systems” by Simon Haykin; John Wiley & Sons.
- “Modern Digital and Analog Communication”, 3rd Edition by B.P. Lathi; Oxford University Press.

REFERENCE BOOKS

- “Digital Communication”, 2E by Sklar; Pearson Education.
- “Principles of Communications” by R.E. Ziemer and W.H. Tranter; JAICO Publishing House.
- “Principles of Communication Systems” by H.Taub and Schilling; TMH.
- “Digital Communications” by John G.Proakis; McGraw Hill.

BTECE 505 (MICROPROCESSOR AND INTERFACING)

UNIT-I

Introduction to Microprocessors: Evolution of Microprocessors, History of computers, Timing and control, memory devices: semiconductor memory organization, Category of memory, 8-bit Microprocessor (8085): Architecture, Instruction set, Addressing modes, Assembly Language Programming.

UNIT-II

16-bit microprocessor (8086): architecture, physical address, segmentation, memory organization, bus cycle, addressing modes, assembly language programming of 8086.

UNIT-III

Data transfer scheme: introduction, types of transmission, 8257(DMA), 8255(PPI), serial data transfer (USART 8251), keyboard- display controller (8279), programmable priority controller (8259).

UNIT IV

Programmable interval timer/ counter (8253/8254): Introduction, modes, interfacing of 8253, application. ADC/DAC: introduction DAC and ADC methods, ADC IC (0808/0809), DAC and ADC interfacing and applications.

UNIT-V

Advanced Microprocessors: Introduction to 32-bit and 64-bit microprocessors, PowerPC, **Microcontroller (8051):** Introduction, Architecture, Instruction set, Introduction to Pentium.

TEXT BOOKS

- R. Singh and B. P. Singh : Microprocessor Interfacing and Application, New Age International Publishers, 2nd Edition.
- B.P. Singh and R. Singh : Advanced Microprocessor and Microcontrollers, New Age International Publishers, 2nd Edition.
- 3." The Intel Microprocessor 8086/8088. 80186, 80286, 80386 and 80486 Architecture Programming and Interfacing "Barry.B.Brey , PHI

REFERENCE BOOKS

- D. V. Hall : Microprocessors Interfacing, TMH (2nd Edition).
- R. S. Gaunkar: Microprocessor Architecture, Programming and Applications with 8085/8080, Penram Publication.

BTECE-601 (MICROWAVE ENGINEERING)

UNIT-I

Propagation through waveguides: Rectangular waveguide, solution of wave equation in rectangular co-ordinates, Derivation of field equations for TE & TM modes degenerate and dominant mode, Power Transmission and Power loss, Excitation of waveguides, non existence of TEM mode in waveguides, Introduction to circular Waveguides, Stripline and microstripline.

UNIT-II

Microwave cavity resonators: Rectangular and cylindrical cavities, Quality factor, Excitation of cavities. Microwave components: Waveguide couplings, bends and twists, Transitions, Directional couplers, hybrid couplers, Matched load, Attenuators and phase shifters, E-plane, H-plane and Hybrid Tees, Hybrid ring, Waveguide discontinuities, Windows, Irises and Tuning screws, Detectors, wave meters; Isolators and Circulators, tunable detector, slotted line carriage, VSWR meter. Scattering Matrix.

UNIT-III

Microwave Measurements: Measurement of frequency, Wave length, VSWR, Impedance, Attenuation, Low and high power. Radiation pattern. Limitation, of conventional active devices at Microwave frequency.

UNIT-IV

Microwave Tubes : Klystron, Reflex Klystron, Magnetron, TWT, BWO: Their schematic, Principle of operation, performance characteristics and application.

UNIT-V

Microwave Semiconductor Devices: PIN diode, Tunnel diode, LSA diode, varactor diode, Gunn Devices, IMPATT and TRAPATT, their Principal of operation, characteristics and applications.

TEXT BOOKS

- Liao, S.Y. / Microwave Devices & Circuits; PHI 3rd Ed.
- M.I. Skolnik, Introduction to Radar Engineering; THM

REFERENCE BOOKS

- Collin, R.E. Foundations for Microwave Engineering; TMH 2nd Ed.
- Rizzi, Microwave Engineering: Passive Circuits; PHI.
- A Das and S.K. Das, Microwave Engineering; TMH.

BTECE 602 (DATA STRUCTURES)

Unit-I

ARRAYS AND LINKED LISTS: Storage structures for arrays, matrix, row-major, column-major, Sparse matrices. Linked list, Doubly linked lists, Circularly linked lists – Operations on polynomials, Dynamic storage management - Garbage collection and compaction.

Unit-II

STACK AND QUEUE: Stacks and queues: insertion, deletion, Stack and queue using linked list, Circular queue, Prefix, postfix, infix notation and conversions.

Unit-III

TREES: Binary tree insertion, deletion, traversal (inorder, preorder and postorder), Binary Search Tree, Threaded binary tree, AVL tree, B-tree, B+-tree.

Unit-IV

SORTING AND SEARCHING: Selection sort, Insertion sort, Bubble sort, Merge Sort, Heap sort, and Quick sort, sorting in linear time, Hash Tables.

Unit-V

GRAPH: Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Algorithm for Kruskal's and Prim's for Finding Minimum cost Spanning Trees, Dijkstra's Algorithm for finding Single source shortest paths.

TEXTBOOKS

- Seymour Lipschutz, *Data Structures with C*, Schaum's Outline Series
- Langsam Yedidyah, Augenstein J Moshe, Tenenbaum M, *Data Structures using C and C++*, PHI.

REFERENCE BOOKS

- Horowitz, Sahni, Freed, *Fundamentals of Data Structures in C*, Silicon Press.
- Kruse R., *Data Structures and Program Design in C*, Pearson Education India.

BTECE 603 (EMBEDDED SYSTEM)

UNIT-I

Overview of Embedded Systems: Characteristics of Embedded Systems. Comparison of Embedded Systems with general purpose processors. General architecture and functioning of micro controllers. 8051 microcontrollers.

UNIT- II

PIC Microcontrollers: Architecture, Registers, memory interfacing, interrupts, instructions, programming and peripherals.

UNIT- III

ARM Processors: Comparison of ARM architecture with PIC micro controller, ARM 7 Data Path, Registers, Memory Organization, Instruction set, Programming, Exception programming, Interrupt Handling, Thumb mode Architecture. Bus structure: Time multiplexing, serial, parallel communication bus structure. Bus arbitration, DMA, PCI, AMBA, I2C and SPI Buses.

UNIT-IV

Embedded Software, Concept of Real Time Systems, Software Quality Measurement, Compilers for Embedded System.

UNIT-V

RTOS: Embedded Operating Systems, Multi Tasking, Multi Threading, Real-time Operating Systems, RTLinux introduction, RTOS kernel, Real-Time Scheduling.

TEXT BOOKS

- Design with PIC Microcontrollers, John B. Peatman, Pearson Education Asia, 2002
- ARM System Developer's Guide: Designing and Optimizing System Software, Andrew N. Sloss,
- Dominic Symes, Chris Wright, Morgan Kaufman Publication, 2004.
- Computers as components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publication, 2000

REFERENCES BOOKS

- The Design of Small-Scale embedded systems, Tim Wilmshurst, Palgrave2003
- Embedded System Design , Marwedel ,Peter , Kluwer Publishers , 2004.

BTECE 701 (VLSI DESIGN)

UNIT-I

Evolution of VLSI, MOS transistor theory, MOS structure, enhancement & depletion transistor, threshold voltage,

UNIT-II

MOS device design equations, NMOS inverter, CMOS inverter, DC characteristics, static load MOS inverter, static & dynamic power dissipation, explanation of different stages in fabrication, body effect.

UNIT-III

Introduction to VHDL, data objects, data types, behavioral modeling structural modeling, data flow modeling, combinational and sequential VHDL design.

UNIT-IV

VLSI designing methodology, design flow, design Hierarchy, concept of regularity, modularity & locality, VLSI design style, Design quality, computer aided design technology, adder design and multiplier design examples. Low power design concepts using CMOS Technology.

UNIT-V

VLSI designing methodology, design flow, design Hierarchy, concept of regularity, modularity & locality, VLSI design style, Design quality, Low power design concepts using CMOS Technology.

TEXT BOOKS

- Basic VLSI Design - Pucknell Douglas A., Eshraghian Kamran, PHI Learning Pvt Limited, 2013.
- N. Weste and D. Harris, "CMOS VLSI Design: A Circuits and Systems Perspective - 4th Edition", Pearson Education, India.

REFERENCE BOOKS

- S. M. Kang, Y. Leblebici, "CMOS digital integrated circuits analysis & design" Tata McGraw Hill, 3rd Edition.
- Digital Integrated Circuit Design- Ken Martin, Oxford University Press
- The MOS Transistor- Yanniis Tsividis and Colin Mcandrew, Oxford University Press, 2013
- J. M. Rabaey, "Digital Integrated Circuits" PHI Learning Pvt Limited, India
- J. P. Uyemura, "Introduction to VLSI Circuits and Systems", John Wiley & Sons, Inc., New York, NY

BTECE 702 (COMPUTER COMMUNICATION NETWORKS)

UNIT- I

Data Communications : Components, protocols and standards, Network and Protocol Architecture, Reference Model ISO-OSI, TCP/IP-Overview ,topology, transmission mode, digital signals, digital to digital encoding, digital data transmission, DTE-DCE interface, interface standards, modems, cable modem, transmission mediaguided and unguided, transmission impairment, Performance, wavelength and Shannon capacity. Review of Error Detection and Correction codes.

UNIT- II

Switching: Circuit switching (space-division, time division and space-time division), packet switching (virtual circuit and Datagram approach), message switching.

Data Link Layer: Design issues, Data Link Control and Protocols: Flow and Error Control, Stop-and-wait ARQ. Sliding window protocol, Go-Back-N ARQ, Selective Repeat ARQ, HDLC, Point-to –Point Access: PPP Point –to- Point Protocol, PPP Stack,

UNIT- III

Medium Access Sub layer: Channel allocation problem, Controlled Access, Channelization, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLAN, high-speed LANs, Token ring, Token Bus, FDDI based LAN, Network Devices-repeaters, hubs, switches bridges.

UNIT- IV

Network Layer: Design issues, Routing algorithms, Congestion control algorithms, Host to Host Delivery: Internetworking, addressing and routing, IP addressing (class full & Classless), Subnet, Network Layer Protocols: ARP, IPV4, ICMP, IPV6 ad ICMPV6.

UNIT-V

Transport Layer: Process to Process Delivery: UDP; TCP, congestion control and Quality of service.

Application Layer: Client Server Model, Socket Interface, Domain Name System (DNS): Electronic Mail (SMTP), file transfer (FTP), HTTP and WWW.

TEXT BOOKS

- A. S. Tannenbum, D. Wetherall, “Computer Networks”, Prentice Hall, Pearson, 5th Ed
- Behrouz A. Forouzan, “Data Communications and Networking”, Tata McGraw-Hill, 4th Ed

REFERENCE BOOKS

- Fred Halsall, “Computer Networks”, Addison – Wesley Pub. Co. 1996.
- Larry L, Peterson and Bruce S. Davie, “Computer Networks: A system Approach”, Elsevier, 4th Ed
- Tomasi, “Introduction To Data Communications & Networking”, Pearson 7th impression 2011
- William Stallings, “Data and Computer Communications”, Prentice Hall, Imprint of Pearson, 9th Ed.
- Zheng , “Network for Computer Scientists & Engineers”, Oxford University Press
- Data Communications and Networking: White, Cengage Learning

BTECE 801 (MOBILE COMMUNICATION SYSTEM)

UNIT I

Cellular mobile telephone architecture overview. Cellular radio system design-- Frequency assignments, frequency reuse channels. Concept of cell splitting. Handover in cellular systems.

UNIT II

Practical Cellular mobile systems-- AMPS and GSM system architecture overview. Call management and system operation. CDMA based cellular system. Wireless in Local Loop-- DECT and CDMA WLL, Long term Evolution (LTE)

UNIT III

Evolution of mobile radio communication fundamentals. Large scale path loss: propagation models, reflection, diffraction, scattering, practical link budget design using path loss model. Small scale fading & multipath propagation and measurements, impulse response model and parameters of multipath channels, types of fading, theory of multi-path shape factor for fading wireless channels.

UNIT IV

Multiple access schemes in mobile communications-- TDMA, FDMA, CDMA. Random Multiple Access Schemes. Performance analysis issues. MAC layer scheduling and connection admission in mobile communication.

UNIT V

Teletraffic modelling and Queuing analysis of cellular mobile networks. Resource allocation and mobility management. Review of Handoff techniques for 3G and 4G Wireless Communication Systems.

TEXT BOOKS

- “Wireless Communication Principle and Practices”, by Rappaport, Pearson.
- “Wireless Communication and Networking” By Vijay K. Garg, Elsevier, 2008.
- “Wireless and personal Communication Systems” by VK Garg and JE Wilkes; Prentice Hall, 1996.

REFERENCE BOOKS

- “Mobile Cellular Telecommunications Systems” by WCY Lee; McGraw Hill International Editions 1990.
- “Mobile Communications Design Fundamentals” by WCY Lee; Prentice Hall, 1993.
- “CDMA: Principles of Spread Spectrum Communications” by AJ Viterbi, Addison Wesley, New York, 1995.

DEPARTMENTAL ELECTIVES (DE)

DTECE DE11 (SENORS AND INSTRUMENTATION)

UNIT-I

Definition, principles of sensing and transduction, classification, Mechanical and Electromechanical sensors Resistive (potentiometric) type: Forms, materials, resolution, accuracy, sensitivity, Strain Gauges: theory, types, materials, design consideration, sensitivity, gauge factor, variation with temperature, adhesives, rosettes, applications force, velocity and torque measurements,

UNIT-II

Inductive sensors: common types- reluctance change type, mutual inductance change type, transformer action type, - brief discussion with respect to materials, construction and input output variables, Ferromagnetic plunger type-short analysis; proximity measurement LVDT: Construction, materials, output-input relationship, I/O curve, discussion

UNIT-III

Capacitive sensors: Variable distance- parallel plate type, Variable area- parallel plate, serrated plate/teeth type and cylindrical type, variable dielectric constant type: calculation of sensitivities; proximity measurement Stretched Diaphragm type: microphones, response characteristics Piezoelectric elements: piezoelectric effects, charge and voltage coefficients, crystal model, materials, natural and synthetic types – their comparison, force and stress sensing, piezoelectric accelerometer Tachometers -Stroboscopes, Encoders, seismic accelerometer, Measurement of vibration.

UNIT-IV

Thermal sensors: Resistance change type: RTD - materials, construction, types, working principle Thermister - materials, construction, types, working principle Thermoemf sensors: Thermocouple - types, working principle Thermopile - types, working principle

UNIT-V

Magnetic sensors: Sensors based on Villari effect for assessment of force, torque, rpm meters, proximity measurement Hall effect and Hall drive, performance characteristics Geiger counters, Scintillation detectors Introduction to Smart sensors

TEXT BOOKS

- D Patranabis, Sensors and Transducers, PHI, 2nd ed.

REFERENCE BOOKS

- E. A. Doebelin, Measurement Systems: Application and Design Mc Graw Hill, New York
- H. K. P. Neubert, Instrument Transducers, Oxford University Press, London and Calcutta

BTECE DE12 (ADVANCED COMPUTER ARCHITECTURE)

Unit-I

PARALLEL COMPUTER MODELS: The state of computing, Classification of parallel computers, Multiprocessors and multicomputer, Multivector and SIMD computers.

PROGRAM AND NETWORK PROPERTIES: Conditions of parallelism, Data and resource Dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms.

Unit – II

SYSTEM INTERCONNECT ARCHITECTURES: Network properties and routing, Static interconnection networks, Dynamic interconnection Networks, Multiprocessor system interconnects, Hierarchical bus systems, Crossbar switch and multiport memory, Multistage and combining network.

PROCESSORS AND MEMORY HIERARCHY: Advanced processor technology, Instruction-set Architectures, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors.

Unit – III

MEMORY TECHNOLOGY: Hierarchical memory technology, Inclusion, Coherence and Locality, Memory capacity planning, Virtual Memory Technology.

BACKPLANE BUS SYSTEM: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt, Cache addressing models, Direct mapping and associative caches.

Unit – IV

PIPELINING: Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch handling techniques, Arithmetic Pipeline Design, Computer arithmetic principles, Static arithmetic pipeline, Multifunctional arithmetic pipelines.

Unit - V

VECTOR PROCESSING PRINCIPLES: Vector instruction types, Vector-access memory schemes. Synchronous Parallel Processing: SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, SIMD Computers and Performance Enhancement.

TEXT BOOKS

- Kai Hwang, *Advanced computer architecture*, TMH, 2000.
- J. P.Hayes, *Computer Architecture and organization*, TMH, 1998.
- M.J Flynn, *Computer Architecture, Pipelined and Parallel Processor Design*, Narosa Publishing, 1998.

REFERENCE BOOKS

- D. A. Patterson, J. L. Hennessy, *Computer Architecture: A quantitative approach*, Morgan Kauffmann, 2002.
- Hwang and Briggs, *Computer Architecture and Parallel Processing*, MGH, 2000.

BTECE DE13 (INFORMATION SECURITY)

Unit-I

INTRODUCTION: History, Critical Characteristics, Components , Approaches of Implementation, Security Systems Development Life Cycle, Security Professionals.

Unit-II

SECURITY ISSUES: Need for Security, threat, risk, attack, legal and ethical issues.

Unit-III

ERROR DETECTION / CORRECTION: Block Codes, Generator Matrix, Parity Check Matrix, Minimum distance of a Code, Error detection and correction, Standard Array and syndrome decoding. Hamming Codes.

Unit-IV

CRYPTOGRAPHY: Modular Arithmetic, Congruence, Plain text, Cipher Text, Key, Encryption, Decryption, Kerckhoff's Principle. Substitution Ciphers, Transposition Ciphers, Types of Attacks on Ciphers. Cryptanalysis of Substitution Ciphers, Transposition Ciphers. Block Cipher, Stream Cipher, Data Encryption Standard, Diffie- Hellma key exchange algorithm, Rabin Cipher, Public Key Infrastructure.

Unit-V

SECURITY TOOLS: Intrusion detection systems, Honey pots, Honey nets and padded cell systems, scanning and analysis tools.

TEXTBOOKS

- Michael E. Whitman & H J Mattord , *Principals of Information Security*, 2nd edition, Thompson technology, 2007.
- Behrouz A Forouzan & Debdeep Mukhopadhyay, *Cryptography and Network Security*, 2nd edition, TMH , New Delhi, 2012.

REFERENCE BOOKS

- Kaufman, Perlman , Speciner, *Network Security*, 2nd Ed., PHI ,India, 2010
- Shu Lin , D. J. Costello, *Error Control Coding: Fundamentals and applications*, Printice – Hall, New Jersey, 2003

BTECE DE14 (MODERN FILTER DESIGN)

UNIT I

Frequency response of bilinear transfer function, Design & Synthesis of first and 2nd order filter.

UNIT II

Butterworth Low Pass filter – Response, Pole locations, Specifications Sallen Key circuit, RC-CR Transformation.

UNIT III

Butterworth Filter – frequency transformation, Delyiannis Friend Circuit, Stagger tuned bandpass Chebyshev and Elliptic Response.

UNIT IV

Circuit structure and analysis of operational trans impedance Amplifier (OTIA) and various generations of current Conveyers

UNIT V

OTIA, current conveyer and their sensitivity analysis. MOSFET-C Filters and techniques of non linearity cancellation in MOS circuit, switch capacitor filter, log domain filters. Classification and Review Active Elements for Analog Signal Processing

TEXT BOOKS

- FERRI, G., GUERRINI, N.C. , Low-Voltage Low-Power CMOS Current Conveyors. Kluwer Academic Publishers, 2003.
- “Principles of active network synthesis and design” by Gobind Daryanani; Wiley, 2003.

REFERENCE BOOKS

- Rolf Schaumann and Mac E. Van Valkenberg, Oxford Indian Edition, 2008.

BTECE DE15 (STATISTICAL SIGNAL PROCESSING)

UNIT I

Review of random signal theory and linear algebra. Linear Signal Models: All-pole models (AR), All-zero models (MA), Pole-zero models (ARMA).

UNIT II

Linear Prediction and Optimum Linear Filters: Forward and backward linear prediction, Levinson-Durbin algorithm (Toeplitz matrix inversion and Cholesky decomposition), minimum-phase property of the linear prediction-error filters, AR lattice structure, ARMA lattice-ladder filter, Orthogonality principle in linear mean-square estimation, IIR Wiener filter, Non-causal Wiener filter.

UNIT III

Power Spectrum Estimation: Estimation of spectra from finite-duration observations of signals, Nonparametric methods (The Bartlett method, The Welch method, The Blackman and Tukey method) and their performance characteristics,

UNIT IV

Parametric methods (Yule-Walker method, Burg method, Unconstrained least square method, Sequential estimation methods, Selection of AR model order), Minimum variance spectral estimation, Eigen-analysis algorithms (Pisarenko harmonic decomposition method, MUSIC algorithm, ESPRIT algorithm, Order selection criteria).

UNIT V

Adaptive Filters: Steepest descent method, LMS algorithm and simplified analysis with emphasis on excess mean square error, Normalized and block LMS algorithm, Least squares method, Kalman, particle filter. Recursive least squares method and their applications. Application: An analysis of statistical behavior of deep-faded signal [1], A discussion on A Hybrid CPF-HAF Estimation of Polynomial-Phase Signals [2].

Text Books

- “Digital Signal Processing” by Proakis & Manolakis; PHI.
- “Adaptive filter theory” by Simon haykin

Reference books

- “Adaptive Signal Processing” by Proakis, Manolakis & Ingle.

BTECE DE21 (DIGITAL IMAGE PROCESSING)

Unit -I

INTRODUCTION AND DIGITAL IMAGE FUNDAMENTALS: The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbours, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

Unit-II

IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN: Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothing and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

Unit - III

IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN: Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.

IMAGE RESTORATION: A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear Position-Invariant Degradations, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

Unit – IV

IMAGE COMPRESSION: Image Compression models, Elements of Information Theory, Error free comparison, Lossy compression, Image compression standards.

IMAGE SEGMENTATION: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Oriented Segmentation.

Unit - V

REPRESENTATION AND DESCRIPTION: Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

TEXTBOOK

- Rafael C. Gonzales, Richard E. Woods, *Digital Image Processing*, 3rd Edition, Pearson Education, 2010.

REFERENCE BOOKS

- Anil Jain, *Fundamentals of Digital Image Processing*, PHI Learning Pvt. Ltd., 2011.
- Jayaraman S., Esaki Rajan S., T.Veera Kumar, *Digital Image Processing*, 2nd Reprint, TMH, 2010.
- Bhabatosh Chanda & Dwejesh Dutta Majumder, *Digital Image Processing and analysis*, 2nd Edition, PHI, 2011.

BTECE DE22 (SATELLITE COMMUNICATIONS)

UNIT I

Introduction: history, frequency allocation, types and band used, Indian scenario, basic satellite system, Satellite orbits - solar day and sidereal day – orbital parameters - satellite trajectory - period, velocity and position of a satellite - geostationary satellites – nongeostationary constellations.

UNIT II

Satellite orbits: laws governing satellite motion, orbital period and velocity, look angles, covering angles and slant range, eclipse, orbital perturbations, orbital effects in communication system performance.

UNIT III

Communication satellites - spacecraft subsystems - payload - repeater, antenna, attitude and control systems - telemetry, tracking and command - power sub system and thermal control, basic link analysis, attenuation in propagation on satellite earth path.

UNIT IV

Earth stations - antenna and feed systems - satellite tracking system - amplifiers - Communication link Analysis- uplink and downlink design, interference analysis, terrestrial interference.

UNIT V

Multiple access techniques - frequency division multiple access - time division multiple access - code division multiple access - access protocols for data traffic. Performance analysis and comparative analysis of FDMA, TDMA and CDMA.

TEXT BOOKS

- “Satellite Communication”, Dennis Roddy ,McGraw Hill

REFERENCE BOOKS

- “Satellite Communication Systems” by Richharia M.; Macmillan Press Ltd.
- “Satellite Communication” by Gagliardi R.M.; CBS.
- “Digital Satellite Communication” by Ha T.T.; MGH.

BTECE DE23 (OPTICAL COMMUNICATION)

UNIT I

Introduction to vector nature of light, propagation of light, propagation of light in a cylindrical dielectric rod, Ray model, wave model. Different types of optical fibers, Modal analysis of a step index fiber. Signal degradation on optical fiber due to dispersion and attenuation.

UNIT II

Fabrication of fibers and measurement techniques like OTDR. Optical sources - LEDs and Lasers,

UNIT III

Photo-detectors - pin-detectors, detector responsivity, noise, optical receivers. Optical link design – BER calculation, quantum limit, power panelities. Optical switches - coupled mode analysis of directional couplers, electro-optic switches.

UNIT IV

Non-linear effects in fiber optic links. Concept of self-phase modulation, group velocity dispersion and solution based communication.

UNIT V

Optical amplifiers - EDFA, Raman amplifier, and WDM systems. Hybrid optical amplifier [1], Optical amplifiers for next generation WDM optical communication networks. Review of High-Speed Mode-Locked Quantum-Dot Lasers and Optical Amplifiers.

TEXT BOOKS

- “Fibre Optic communication”, 2nd Edition, 1992 by J.Keiser; McGraw-Hill.
- “Optical communication systems” by J.Gowar; Prentice Hall India, 1987.

REFERENCE BOOKS

- “Optical fibers for transmission” by J.E. Midwinter; John Wiley, 1979.
- “Optical fibres telecommunications” by S.E. Miller and A.G. Chynoweth, eds.; Academic Press, 1979.
- “Nonlinear fibre optics” by G.Agrawal; Academic Press, 2nd Ed. 1994.

BTECE DE24 (NON-LINEAR CIRCUITS AND SYSTEMS)

UNIT-1

Perturbation theory for the analysis of nonlinear circuits.

UNIT-II

Examples of nonlinear systems: Pendulum, Mechanics, Fluid dynamics, Circuit theory with nonlinear components, Chaotic systems: Sensitivity to initial conditions, impossibility of prediction,

UNIT-III

Phase Space: Preservation of areas for conservative systems, stability using Lyapunov's function, dissipative systems, attractors, Hamiltonian systems.

UNIT-IV

Linearization of nonlinear systems, Poincare sections, spectral analysis, Bifurcation diagrams & period doubling, Logistic map, circle map, horseshoe map, forced duffing oscillator, Lyapunov exponents.

UNIT-V

Chua's circuit: Examples of oscillations in piecewise linear circuits, Illustration by theory, The concept of equilibria, stability, local and global behavior.

TEXT BOOKS

- "Linear and Nonlinear Circuits" by Chua, Desoer and Kuh; Mc Graw Hill.

REFERENCE BOOKS

- "Chua's Circuits: A Paradigm for Chaos" Edited by Rabinder N. Madan, World Science, Series B, Vol. 1.

BTECE DE25 (MICROWAVE INTEGRATED CIRCUITS)

UNIT I

Active RF Component Modelling: Diode models, Transistor models – Large and small signal BJT and FET models, Measurement of active devices, S-parameter device characterization

UNIT II

Amplifier Design: Unilateral and non-unilateral design, One stage and multistage design, Low-noise amplifiers, Highpower amplifiers, Balanced amplifiers, Feedback, Design examples, Small-signal distributed amplifiers.

UNIT III

Oscillator Design Resonators, Dielectric resonators, YIG resonators, Varactor resonators, Resonator measurements, Two-port oscillator design, Low-noise design. Non-linear oscillator model.

UNIT IV

Mixer Design: Diode mixer theory, Single diode mixers, Single-balanced mixers, Double balanced mixers, FET mixer theory, Balanced FET Mixers, Spectral mixer circuits, Image rejection mixer., Single side band modulator performance, Simple sub harmonically pumped mixer circuit configuration.

UNIT V

Filter Design: Filter design by the insertion loss method, Filter scaling and transformations, Low-pass and High pass filters using transmission line stubs, Stepped-impedance low-pass filters, Bandpass filters using transmission line resonators.

MIC Design: Integrated microwave workstation approach, Non-linear tools, Field drivers design, Designing non linear circuits using the harmonic balanced method, Programmable microwave tuning system, Introduction to MMIC considering layout effects, Microwave integrated circuit components.

TEXT BOOKS

- George.D.Vandelin, Anthony M.Pavis and Ulrich L.Rohde, “Microwave circuits design using linear and non linear techniques”, John Wiley and sons 1990.
- Samuel T.Liao, “Microwave Circuits and analysis and amplifier design”, PHI,
- Jeffrey Frey and Kul.Bhasin, “Microwave Integrated Circuits”, Artech House

REFERENCE BOOKS

- Davis M Pozar, “Microwave and RF Design of Wireless SYSTEMS”, John Wiley and Sons.
- Ludwig and Bretchko, “RF Circuit Design”, Pearson Education (India).

BTECE DE31 (OPTICAL NETWORKS)

UNIT-I

Overview of optical fiber communication devices, evolution, transmission systems, Optical Layer: Line systems, Basics of transmitting bits, Fiber and Components, Fiber, transmitters, receivers, amplifiers, simple couplers, channel impairment parameters (signal power attenuation, dispersion, noise, etc

UNIT-II

WDM line systems, Components: multiplexers, demultiplexers, amplifiers, filters, Circulators, couplers, splitters, switches, Transmission system engineering, and design. Optical Layer: Network – Circuit switched paradigm, Rings and mesh topologies,

UNIT-III

Components, OADMs, switches Network Design, Client models, Routing and traffic grooming, Traffic models, Optimization algorithms and methods – routing algorithms, integer and mixed integer linear programming, heuristic optimization algorithms, HFC, FTTH-FTTP, PONS

UNIT-IV

Network Survivability, Standard protection and restoration, rings, mesh topologies SONET/SDH, Next Generation SONET, Fast reroute

UNIT-V

Resilient Packet Rings Generalizations: Quality of protection, network coding, protecting path segments, p-cycles SONET/ SDH, GFP, Ethernet, Storage Area Networks, MPLS, OTN, ASON,GMPLS .

TEXT BOOKS

- “Optical Networks” by Rajiv Ramaswami and Kumar Sivarajan, Second edition; Morgan, Kaufmann Publishers.
- “Optical fiber communications”, 3rd ed. by Keiser, G.; McGraw-Hill, 2000.
- “Optical Networks” by Stern, T.; Bala, K. Multiwavelegth; Addison Wesley, 1999.

REFERENCE BOOKS

- “DWDM fundamentals, components and applications” by Laude, J. P.; Artech House, 2002.
- “Optical WDM Networks” by Mukherjee, Biswanath; Springer, 2006.
- “Next generation optical networks: the convergence of IP intelligence and optical technology; Prentice Hall, 2002.

BTECE DE32 (DIGITAL SYSTEM TESTING AND DIAGNOSIS)

UNIT-I

Overview of Electronic Testing, Test process and Automatic Test Equipment (ATE).

UNIT-II

Test Economics, Yield Analysis, Fault modelling, Logic and Fault Simulation Algorithms.

UNIT-III

Testability measures, Combinational and Sequential Automatic Test Pattern Generation Algorithms,

UNIT-IV

D-algorithm, PODEM, FAN, Memory Testing, IDDQ Testing, Design for Testability (DFT) techniques, Built-in Self-test (BIST),.

UNIT-V

Boundary Scan and Scan Design testing, design rules, scan implementation.

BTECE DE33 (DETECTION AND ESTIMATION THEORY)

UNIT-I

Review of probability theory and linear algebra: Multivariate normal distribution, its characterization and properties.

UNIT-II

Basic detection theory: Bayes and Minimax criterion, likelihood ratios, false alarm and detection probabilities, receiver operating characteristic bounds on the error probabilities, M hypothesis detection, Composite Hypothesis testing, The general Gaussian detection problem.

UNIT-III

Detection of signals in white and colored Gaussian noisewhening filter method. Detection of signals with unwanted parameters.

UNIT-IV

Applications in M-ary hypothesis testing for FSK, ASK and PSK signaling schemes waveform estimation.

UNIT-V

Estimation Theory : Random Parameters, Bayes Estimation, Parameter Estimation Multiple Parameter Estimation. Linear and non linear signal parameter estimation

TEXT BOOKS

- "Detection, Estimation, and Modulation theory Part-I", Harry L. Van Trees
- "Detection, Estimation, and Modulation theory Part-II", Harry L. Van Trees
- "Detection, Estimation and Modulation theory Part-III", Harry L. Van Trees

REFERENCE BOOKS

- "Fundamentals of Statistical Signal Processing, Volume
- Estimation Theory, Kay : Pearson

BTECE DE34 (HIGH SPEED NETWORKS)

UNIT-I

Introduction: The Need for Speed and Quality of Service. Advanced TCP/IP and ATM Networks. Protocols and Architecture: The Need for a Protocol Architecture. The TCP/ IP Protocol Architecture. The OSI Model. Internetworking. Transmission Control Protocol (TCP). User Datagram Protocol. The Internet Protocol (IP). IPv6.

UNIT-II

HIGH-SPEED NETWORKS : Frame Relay:Packet-Switching Networks. Frame Relay Networks. Asynchronous Transfer Mode (ATM) : ATM Protocol Architecture. ATM Logical Connections ATM Cells. ATM Service Categories. ATM Adaptation Layer (AAL). High-Speed LANs : The Emergence of High-Speed LANs. Ethernet. Fibre Channel. Wireless LANs.

UNIT-III

PERFORMANCE MODELING AND ESTIMATION : Probability. Random Variables. Stochastic Processes Queuing Analysis : Queuing Models. Single-Server Queues. Multiserver Queues. Queues with Priorities. Networks of Queues. Other Queuing Models. Estimating Model Parameters

UNIT-IV

CONGESTION AND TRAFFIC MANAGEMENT : Effects of Congestion. Congestion and Control. Traffic Management. Congestion Control in Packet-Switching Networks. Frame Relay Congestion Control. The Need for Flow and Error Control. Link Control Mechanisms. ARQ Performance. TCP Flow Control. TCP Congestion Control. Performance of TCP Over ATM

UNIT-V

Internet Routing: Elementary Concepts of Graph Theory. Shortest Path Length Determination. Interior Routing Protocols: Internet Routing Principles. Distance-Vector Protocol: RIP. Link-State Protocol: OSPF. Exterior Routing Protocols and Multicast. Path-Vector Protocols: BGP and IDRP. Multicasting.

TEXT BOOKS

- “Business Data Communications” by William Stallings, Fifth Edition; Prentice Hall
- “High Speed Networks: TCP/IP and ATM Design Principles” by Stallings, William; Prentice-Hall, 1998.

REFERENCE BOOKS

- “An Introduction to Broadband Networks”: LANs, MANs, ATM, B-ISDN, and “Optical Networks for Integrated Multimedia Telecommunications” by Anthony Acampora; Plenum, 1994.
- “High – Performance Communication Networks” by Jean Walrand and Pravin Varaiya,; Morgan Kaufmann, 1996.

BTECE DE36 (CMOS ANALOG IC DESIGN)

UNIT-I

Large Signal Models of MOS Transistors: I-V Characteristics, Early Effect, Channel Length Modulation, Back Gate Effect and other Second-Order Effects. Passive Components: Properties of Resistors and Capacitors and Matching Considerations

UNIT-II

Analog Sub-circuits: Basic MOS Amplifiers, Differential Pairs, Current Sources, MOS Switches, and Basic Sample/Hold Circuit, Basic Two-Stage Op-Amp Design: NMOS and CMOS architectures, DC Design, Frequency Compensation, Slew Rate, Power Supply Rejection, Offset Voltage calculation and Noise considerations Advanced CMOS OP Amp Configurations: Folded-Cascode Op-amp, Class AB Op-amps, and Fully Differential op-amp

UNIT-III

Voltage References: Basic Design and Evaluation of Band Gap Reference, and CMOS Band Gap References MOS Voltage Comparators: Various Configurations and Offset Cancellation Techniques

UNIT-IV

Digital-to-Analog and analog to digital converters Current scaling DAC, Voltage scaling DAC charge scaling DAC, Extending resolution of parallel DAC, similar scaled DACs High speed ADCS, parallel or flash ADCS, interpolating ADCS, folding ADCS, Multibit pipeline ADCS delta sigma modular, Decimators filters.

UNIT-V

Switched Capacitor Filters: Basic Switched Capacitor Integrators, Z-transforms, and Switched Capacitor Filter Design CMOS Voltage Reference Circuit based on Subthreshold MOSFETs [1], charge pump[2]

TEXT BOOKS

- “Design of Analog CMOS Integrated Circuits” by Behzad Razavi; Tata Mc Graw-Hill
- “CMOS analog Circuit Design” by Allen Holberg; Oxford University Press

REFERENCE BOOKS

- “Analog VLSI Signal and Information Processing” by Mohammed Ismail Terri Fiez; Mc Graw Hill International Editions.
- “Analog MOS Integrated Circuits for Signal Processing” by Roubik Gregorian and Gabor C. Temes; Wiley series on filters
- “Analysis and Design of Analog Integrated Circuits”, Fourth Edition by Gray Hurst Lewis Meyer, Wiley

BTECE DE41 (FAULT TOLERANT COMPUTING)

UNIT-I

Faults in Digital Circuits: Stuck-At- Faults, Bridging Faults, Stuck-Open Faults, test generation for combinational logic circuits: Path Sensitization, Boolean difference etc.

UNIT-II

Computer aided testing scheme for combinational digital circuits: D-Algorithm, PODEM and FAN Algorithm.

UNIT-III

Test generation for sequential circuits: state identification experiments, checking experiments and machine identification. Easily Testable Design and Diagnosis Sequential Machine,

UNIT-IV

Self Checking and Fail Safe Logic: Design of Totally Self Checking Checkers. Fail safe design. Totally Self Checking PLA design.

UNIT-V

Random testing, transition count testing, signature analysis, LSSD, built in test BILBO and BIDCO, Design for autonomous self test, controllability and observability, RMC and Syndrome Testable Design. Fault Detection in RAM and Microprocessor.

TEXT BOOKS

- "Fault Tolerant and Testable Hardware Design", P. K. Lala: prentice hall USA, & BS publication INDIA.
- "Digital Circuit and Logic Design", S. C. Lee, (PHI).

REFERENCE BOOKS

- "Digital System Testing and Testable Design" by M.Abramovici, M. A. Breuer, A. D. Friedman, IEEE press USA; & JYCO, INDIA.
- "Checking Experiments in Sequential Machine" by A. Bhattacharyya Wiley Easton (New Age International, INDIA).

BTECE DE42 (AUDIO AND VIDEO ENGINEERING)

UNIT-I

Sampling, Nyquist theorem, quantization, image characteristics, audio and video characteristics (telephone, CD, NTSC, PAL, HDTV qualities). Compression: lossless and lossy coding, run-length coding, Huffman and Arithmetic Encoding, JPEG, MPEG.

UNIT-II

Teleservices. Conversational services - video conferencing. Messaging services: multimedia mail (MIME, X.400). Retrieval services: video on demand, video servers, web services.

UNIT-III

Digital Radio and Audio Compression: Audio Data Rate Reduction Techniques: Sub band coding, Predictive coding, Psycho acoustic coding, MPEG Audio, Digital Radio: System Overview, Single frequency networks in practice, Digital Radio - Present and Future: Audio services, Data services

UNIT-IV

VIDEO SYSTEMS: Video cameras and CCD technology, Analog video signal coding, Display of video images, Magnetic recording of video signals, camcorders and VCR, Digital recording tools on microcomputers and hard disks, Audio/video storage on CD and various CD formats, Digital Video Transmission, Digital Video Compression Overview of the DVB System Block diagram overview to put the following sessions into context Digital Video Compression and MPEG, Motion compensation, Constant and variable bit rate transmission

UNIT-V

MPEG: The MPEG-2 standard : Picture Quality Assessment, Background to quality assessment and measurement, Approaches to Automated Quality Measurement.

BASIC CONCEPTS OF TELEVISION: The components in television scanning systems, Luminance signal ,H and V synchronization requirements, Bandwidth calculations and frequency requirements, Kell factor, Interlaced and progressive scans, Picture resolution, Video spectrum distribution, Gamma correction, HVS requirements, Color concepts, RGB analogy and CIE chart, Color cameras, Color displays, Transport Streams: Data Stream Multiplexing, DVB Service Information, Electronic Programme Guide, Transport stream health checking, DVB Scrambling Digital Television and Convergence in Home Entertainment: The TV screen as a mass- market internet terminal, Standards - or lack of them, Converting dreams into reality, HDTV

TEXT BOOKS

- Television and Video Engineering, A.M Dhake.
- Colour Television Theory and Practice , RR Gulati
- Multimedia in Practice, Technology and Applications, Judith Jeffcoate : PHI

REFERENCE BOOKS

- Audio- Video Engineering , Gupta

BTECE DE43 (PATTERN RECOGNITION)

UNIT-I

Introduction to pattern recognition and applications to OCR, speech recognition, fingerprints, signatures etc. Commercial importance of applications. Introduction to Statistical, Neural and Structural Approaches.

UNIT-II

Statistical Pattern Recognition: Patterns and classification, discriminant functions, Bayes decision rule, nearest neighbour rule, probability of error.

UNIT-III

Linear discriminant functions: Perceptrons and training, LMSE approaches. Unsupervised learning and clustering. Feature extraction.

UNIT-IV

Neural Approach: Introduction to artificial neural networks, feed forward networks, delta rule and backpropagation, Hopfield networks and unsupervised learning, Adaptive resonance architectures, related techniques. Pattern associators and content addressable memories, hardware realizations.

UNIT-V

Syntactic pattern recognition: Formal languages and grammars Pattern grammars and higher dimensional grammars, Parsing, Automata realizations, stochastic grammars, Grammatical Inference, computational learning theory, Valiant's framework.

TEXT BOOKS

- "Pattern Recognition: Statistical, Structural and Neural Approaches" R. J. Schalkoff; Wiley, 1992.

REFERENCE BOOKS

- "Pattern Classification and Scene Analysis" by R. O. Duda and P. E. Hart; Wiley, New York, 1973.
- "Structural Methods in Pattern Recognition" by L. Miclet; North Oxford Academic, London, 1986.

BTECE DE44 (INFORMATION SECURITY)

Unit-I

INTRODUCTION: History, Critical Characteristics, Components , Approaches of Implementation, Security Systems Development Life Cycle, Security Professionals.

Unit-II

SECURITY ISSUES: Need for Security, threat, risk, attack, legal and ethical issues.

Unit-III

ERROR DETECTION / CORRECTION: Block Codes, Generator Matrix, Parity Check Matrix, Minimum distance of a Code, Error detection and correction, Standard Array and syndrome decoding. Hamming Codes.

Unit-IV

CRYPTOGRAPHY: Modular Arithmetic, Congruence, Plain text, Cipher Text, Key, Encryption, Decryption, Kerckhoff's Principle. Substitution Ciphers, Transposition Ciphers, Types of Attacks on Ciphers. Cryptanalysis of Substitution Ciphers, Transposition Ciphers. Block Cipher, Stream Cipher, Data Encryption Standard, Diffie- Hellma key exchange algorithm, Rabin Cipher, Public Key Infrastructure.

Unit-V

SECURITY TOOLS: Intrusion detection systems, Honey pots, Honey nets and padded cell systems, scanning and analysis tools.

TEXTBOOKS

- Michael E. Whitman & H J Mattord , *Principals of Information Security*, 2nd edition, Thompson technology, 2007.
- Behrouz A Forouzan & Debdeep Mukhopadhyay, *Cryptography and Network Security*, 2nd edition, TMH , New Delhi, 2012.

REFERENCE BOOKS

- Kaufman, Perlman , Speciner, *Network Security*, 2nd Ed., PHI ,India, 2010
- Shu Lin , D. J. Costello, *Error Control Coding: Fundamentals and applications*, Printice – Hall, New Jersey, 2003.

BTECE DE45 (WIRELESS SENSOR NETWORK)

UNIT-I

Adhoc Networks: Introduction. Routing protocols :proactive and reactive methods, backbone and position based, and power efficient routing.

UNIT-II

Sensor Networks: Introduction and applications. Design issues and architecture. Sensor deployment – Issues and challenges, Self organization, Localization

UNIT-III

Data Fusion: Tree construction algorithms and analysis, Asymptotic capacity, - Lifetime optimization formulations.

UNIT-IV

Routing protocols: data centric, hierarchical, location based, energy efficient routing etc. Design of WSN .

UNIT-V

Querying, data collection and processing, Case study of WSN: Disaster Management, Forest fire, Flood Control, WSN architecture and protocol [3,4].

TEXT BOOKS

- “Handbook of Algorithms for Wireless Networking and Mobile Computing” by Azzedine Boukerche; Chapman & Hall/CRC, 2006.
- “Handbook of Sensor Networks: Compact Wireless and Wired sensing systems” by Mohammad Ilyas and Imad Mahgoub; CRC Press, 2005.

REFERENCE BOOKS

- “Wireless Sensor Network Designs” by Anna Hac; John Wiley & Sons Ltd., 2003.
- “Wireless Sensor Networks: A systems perspective” by Nirupama Bulusu and Sanjay Jha; Artech House, August 2005.

BTECE DE46 (NANO ELECTRONICS)

UNIT-I

Introduction to Nanoelectronics, Shrink Down Approaches, CMOS Scaling, the Nanoscale MOSFET, FINFETs, Vertical MOSFETs, Strained Silicon Technology, Limits to Scaling, System Integration Limits (Interconnect Issues, etc.)

UNIT-II

Resonant Tunneling Diodes, Resonant Tunneling Transistors, MOBILEs (Monostable-Bistable Transition Logic Elements), Single Electron Transistors, New Storage Devices, SRAM, DRAM, MRAM (Magnetoresistive RAM), PCRAM (Phase Change RAM), AFM based Mass Storage (the Millipede Concept), Optoelectronic and Spintronic Devices.

UNIT-III

Molecular Electronics (involving single molecules as electronic devices), Transport in Molecular Structures, Molecular Systems as Alternatives to Conventional Electronics, Molecular Interconnects. MEMS, FBARs (Film Bulk Acoustic Resonators), Cantilevers.

UNIT-IV

Carbon Nanotube Electronics: Bandstructure & Transport, Devices (CNTFETs, CNT Logic Gates, CNT RTL Circuits, CNT SET, CNT RAM, CNT Field Emission Devices), Carbon Nanotube Interconnects, CNT Heat Sink, Applications. Graphene Based Electronics: Bandstructure & Transport, Devices (GNR FETs), Applications. Nanowire FETs, Nanowire Logic Gates.

UNIT-V

Nanosensors: Biological and Chemical; Electronic Sensor Arrays, CMOS 3-D Time-of-Flight Image Sensor, Nanobiomimetic Technologies: Electronic Skin, Electronic Eye, Electronic Nose (KAMINA), Electronic Tongue; Touchscreens, Robot Tactile Sensors, Fingerprint Sensors, Liquid Crystal Displays, Organic Electronic Devices: Organic Light Emitting Diodes, Organic Solar Cells, Organic Thin Film Transistors; Field Emission & Plasma Displays, Electronic Paper. Neuroelectronic Systems: Iono-electronic Interface, Neuron-Silicon Circuits, Brain-Silicon chips Neuroelectronic Processors, Neuroprosthetics, Electrical Dynamics of the Neuron-Chip Interface on a Nanoscopic Level, Hybrid Systems made of Neuronal Nets and Electronic Devices on a Microscopic Level, Iono-electronic Devices, Nerve-based Ionic Processors.

TEXT BOOKS

- Nanoelectronics and Information Technology Advanced Electronic Materials and Novel Devices) by Rainer Waser (Wiley-VCH)
- Nanoelectronics (Principles and Devices, Second Edition) by Mircea Dragoman (Artech House).

REFERENCE BOOKS

- Fundamentals of Nanoelectronics by George W. Hanson (Pearson)

BTECE DE47 (SPEECH PROCESSING)

UNIT-I

Sampling theory: Sampling frequency , Sampling resolution, Filter bank analysis: Spectrograms , Non-linear frequency scales, Short-term fourier analysis: Windowing ,The shortterm Fourier transform, Zero padding Fast Fourier transforms, Practical application of the short-term Fourier transform Overlap and add for linear filtering , Example: Spectral subtraction, Cepstral analysis, Homomorphic filtering, Mel scaled analysis, The Autocorrelation from the FFT.

UNIT-II

Linear prediction analysis: Obtaining candidate values, Peak picking on the smoothed spectrum, Peak picking on the LP spectrum, Factoring for the LP roots, Fitting bumps, Combining candidates

UNIT-III

Formant analysis: Motivation from lossless tubes , Parameter estimation, The autocorrelation method The covariance method, Pre-emphasis ,The LP spectrum , Gain computation ,The lattice filter implementation ,The Itakura distance measure, The LP cepstrum ,Log area ratios, The roots of the predictor polynomial, Line spectral pairs

UNIT-IV

voicing analysis: Pitch synchronous analysis, Zero-crossing points, Peak in the autocorrelation function, Peak in the autocorrelation of the LP residual, The average magnitude difference function, Peak in the cepstrum, Combining candidates

Speech Encoding: Types of Speech Encoders, Waveform Encoding: Pulse Code Modulation (PCM), Differential PCM (DPCM), Delta Modulation (DM), Adaptive DPCM, Adaptive DM, Speech Properties, Channel Vocoders,

UNIT-V

Linear Predictive Coders, Hybrid Techniques, Multi-Pulse Linear Predictive Coder, Regular Pulse Excited Long Term Prediction Coder, Codebook Excited Linear Predictive Coders, Speech Coders for the American and European Systems, Other Waveform Coding Techniques, Sub-band Coding - Transform Coders

TEXT BOOKS

- “Digital Processing of Speech Signals” by Rabiner and Sc.

REFERENCE BOOKS

- “Signal Processing of Speech Owens” by F.J. (1993), Macmillan.
- “Discrete-Time Processing of Speech Signals” by Deller, J.R., Proakis, J.G. and Hanson, J.H. (1993); Macmillan.

BTECE DE51 (SOFT COMPUTING)

Unit-I

NEURAL NETWORKS: History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptron, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

Unit-II

FUZZY LOGIC: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation.

OPERATIONS ON FUZZY SETS: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

FUZZY ARITHMETIC: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Unit-III

FUZZY LOGIC: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges

Uncertainty based Information: Information & Uncertainty,

INFERENCE: Mamadani and T-S models

APPLICATION OF FUZZY LOGIC: Medicine, Economics etc.

Unit-IV

Neuro-Fuzzy Systems: Introduction to Neuro-Fuzzy Systems, Architecture of Neuro Fuzzy Networks.

Unit V

EVOLUTIONARY OPTIMIZATION TECHNIQUES: Genetic Algorithm: An Overview, GA in problem solving, Implementation of GA, Particle Swarm Optimization.

TEXTBOOKS:

- J. A. Anderson, *An Introduction to Neural Networks*, PHI, 1999.
- Hertz J. Krogh, R.G. Palmer, *Introduction to the Theory of Neural Computation*, Addison-Wesley, California, 1991.
- G.J. Klir & B. Yuan, *Fuzzy Sets & Fuzzy Logic*, PHI, 1995.

REFERENCE BOOKS:

- J. A. Freeman, D.M. Skapura, *Neural Networks: Algorithms, Applications and Programming Techniques*, Addison Wesley, 1992.
- Melanie Mitchell, *An Introduction to Genetic Algorithm*, PHI, 1998

BTECE DE52 (COMPUTER VISION)

Unit-I

INTRODUCTION: Machine vision systems, optics and lenses, image sensors, human vision and Neuro-visual model; Marr's paradigm; Imaging geometry - world co-ordinate system and camera co-ordinate system, co-ordinate transformations, projection geometry, camera calibration, radiometry.

Unit-II

EARLY PROCESSING AND IMAGE FILTERING: Noise removal, region segmentation, concept of primal sketch, scale space, edge detection and localization, edge linking, Hough transform, corner and junction detection. Reflectance map and photometric stereo: Image brightness and radiometry, image formation and surface reflectance under different conditions, reflectance map and bidirectional reflectance distribution function, photometric stereo recovering albedo and surface orientation, shape from shading.

Unit-III

RANGE MEASUREMENT AND RECOVERING SCENE GEOMETRY: Binocular technique stereo pair, epipolar line and plane, Stereo matching, photogrammetry, monocular technique - texture processing and shape from texture, depth from focusing and symmetry, different range finder (active) - laser range finder, light-stripe method.

Unit-IV

MOTION ESTIMATION: Motion field, optical flow - smoothness, boundary conditions, discontinuities of optical flow, block based method, pre-recursive method, Bayesian method, Motion segmentation method, motion from points and lines, token tracking, stereo and motion tracking, use of Kalman filter, focus of expansion, structure from motion, motion compensated filtering and restoration, video compression, active and passive surveillance.

Unit-V

REPRESENTATION AND ANALYSIS OF POLYHEDRAL SCENE: understanding line drawings, gradient and dual space, generalized cylinder, volumetric representation, edge and junction labelling; Labelling and recognition of scene objects; Construction of model-base and visual learning, model based recognition system - Acronym, model based recognition from sparse range data, 3D model based vision system, scene understanding.

TEXTBOOKS

- D. H. Ballard and C. M. Brown, *Computer Vision*, Prentice Hall, New York, 1986.
- R. M. Haralick, L. G. Shapiro, *Computer and Robot Vision*, Addison-Wesley, 1992.

REFERENCE BOOKS

- Y. Shirai, *Three-Dimensional Computer Vision*, Springer-Verlag Berlin, 1988.
- B. K. P. Horn, *Robot Vision*, MIT Press, Cambridge, 1986.

BTECE DE53 (NEURO ELECTRONICS)

UNIT-I

Introduction to Neuroelectronics; neuron: architecture, resting membrane potential, action potentials, axon hillock, synapse, presynaptic cell, postsynaptic cell, synaptic cleft, communication between neurons, neurotransmitters, synaptic potential, depolarization, hyperpolarization.

UNIT-II

Recording electrical signals from neurons: voltage –clamp technique, patch-clamp technique. EEG (Electroencephalography)

UNIT-III

Neuroelectronic Interfacing: Iono-Electronic Interface, Neuron-Silicon Circuits, Brain-Silicon Chips. Electrical Dynamics of the Neuron-Chip Interface on a Nanoscopic Level. Interfacing neurons with carbon nanotubes: Electrical signal transfer and synaptic stimulation in cultured brain circuits. Nanowire Integrated Microelectrode Arrays for Neuroelectronic Applications

UNIT-IV

Techniques for neuroelectronic interfacing: thin-film technology, micro-electrode arrays (MEAs), Field Effect- Transistor arrays (FETs), CMOS integrated systems, Nanotechnology and Biochemistry, EOSFET (Electrolyte Oxide Silicon Field Effect Transistor), EOS Capacitors (Electrolyte Oxide Silicon Capacitors)

UNIT-V

Elementary neuroelectronic hybrids: Cellular neuroprostheses, neuronal memory on chip. Neuronal networks on chip. Ionoelectronic Devices, Neuroelectronic Processors. Neuroprosthetics: sensory prosthetics, motor prosthetics, cognitive prostheses. Artificial pacemakers, cochlear implants, deep brain stimulation, brain-computer interface, MRI, Image-Guided Surgery

TEXT BOOKS

- Principles of Neural Sciences, 4th Edition, by E. R. Kandel, J. H. Schwartz, T. M. Jessell (McGraw-Hill Companies, 2000)
- Neuroscience, 3rd Edition by D. Purves, G. J. Augustine, D. Fitzpatrick, L. C. Katz, A.- S. LaMantia, J. O. McNamara, S. M. Williams (Sinauer Associates Inc., 1997)

REFERENCE BOOKS

- An Introduction to Molecular Neurobiology by Z. W. Hall (Sinauer Associates Inc.1992)
- Sensation & Perception by E. Bruce Goldstein (8th Edition) (2007 Wadsworth Cengage Learning)
- Biophysics of Computation (Information Processing in Single Neurons) by C. Koch (Oxford University Press, 1999)
- Neuroprosthetics (Theory & Practice) by K W Horch, G S Dhillon (World Scientific Publishing)

BTECE DE54 (POWER ELECTRONICS)

UNIT-I

Power Semiconductor Devices (PSD): Power Diodes, Enhancement of Reverse blocking capacity, Reverse Recovery Silicon Controlled Rectifier (SCR) Structure, v-i characteristics, turn ON and turn OFF characteristic, ratings, control circuits design and protection circuits. Gate turn off thyristor (GTO) v- characteristic, turn ON, turn OFF characteristic, limitation of power handling capability, GTO snubber consideration exc., Triac and its application, power MOSFETs, operation modes, switching characteristics, power BJT, second breakdown, saturation and quasi saturation state.

UNIT-II

Insulated Gate Bipolar Transistors (IGBT) Basis structure, V-I characteristics, switching characteristics, device limitations and safe operating area (SOA) etc. Introduction to emerging devices and circuits, MOS controlled thyristors, integrated Gate Commutated Thyristor (IGCT), Power Integrated Circuits (PIC's) and smart power control chips.

UNIT-III

Power Electronic Converters: Single phase and three phase uncontrolled and controlled AC to DC converters analysis, DC to AC converters (inverters) single phase half bridge, full bridge and switch mode inverters, three phase inverter with 120o and 180o mode of control, Series inverter and parallel inverters.

UNIT-IV

Choppers principle, first quadrant, second quadrant and multi quadrant and multi quadrant choppers and their analysis. Switch mode converters AC to AC converters, cycloconverters topology and structure of matrix power electronics converters, converter protection and future converter applications.

UNIT-V

Pulse width Modulation for Power Electronics Converters: PWM methods, voltage control PWM, SPWM, selected harmonic elimination, minimum ripple current , current control PWM, Adaptive hysteresis band method, space vector method, performance criterion, open loop and closed loop PWM schemes etc. Motor Drives Applications: Criterion for selecting drive components, DC motor drives, rectifier control of DC motors, chopper control of DC drives, Multi-quadrant control of chopper fed motors, closed loop control of DC drives, Introduction to Induction motor drives: Comparison of variable frequency drives. Field orientation control principles for induction motors, Introduction to synchronous motors drives and PMSM drives. Electric Utility Applications: Brief introduction to UPS, HVDC, Static VAR compensators and STATCOM, Active filters

TEXT BOOKS

- "Power Electronics: Circuits Devices & Applications" by Rashid M H, PHI
- "Power Electronic, Converters, Applications and Design" by Ned Mohan, Tore.
- "Power Electronics" by M.Undeland and William P. Robbins; John Wiley & Sons, 1989. P.S.Bhimra, Khanna Publications.

REFERENCE BOOKS

- "Power Semiconductor Controlled Drives" by Gopal K. Dubey; Prentice Hall, Englewood cliffs
- "Modern Power Electronics and Variable Frequency Drives" by B.K. Bose; Pearson
- "Fundamental of Power Electronics" by Robert W. Erickson and Dragon Maksimovie, Springer International Edition.

BTECE DE55 (PROBABILITY AND STOCHASTIC PROCESSES)

Unit-I

PROBABILITY REVIEW: Random variables, Countable sets, Discrete random variables, Expectation , Events and probability, Dependence and independence, Conditional probability, Examples.

Unit-II

STOCHASTIC PROCESSES: The canonical probability space, Constructing the Random Walk, Simulation , Random number generation, Simulation of Random Variables, Monte Carlo Integration.

Unit-III

GENERATING FUNCTIONS: Definition and first properties, Convolution and moments, Random sums and Wald's identity.

Unit-IV

RANDOM WALKS: advanced methods: Stopping times, Wald's identity, The distribution of the first hitting time T_1 , recursive formula, Generating-function approach.

Unit-V

MARKOV CHAINS: Markov property, Examples, Chapman-Kolmogorov relations.

TEXTBOOKS

- Peyton Z. Peebles, Probability, *Random Variables & Random Signal Principles*, 4th Edition TMH.
- Athanasios Papoulis and S. Unnikrishna Pillai Probability, *Random Variables and Stochastic Processes*, 4th Edition, PHI.

REFERENCE BOOKS

- R.P. Singh and S.D. Sapre, *Communication Systems Analog & Digital*, TMH, 1995.
- Henry Stark and John W. Woods, *Probability and Random Processes with Application to Signal Processing* , 3rd Edition, Pearson Education.

BTECE DE56 (BIO-MEDICAL ENGINEERING AND INSTRUMENTATION)

UNIT-I

Introduction to Bio-Medical Signals: Classification, Acquisition and Difficulties during Acquisition. Basics of Electrocardiography, Electroencephalography, Electromyography & electro-retinography Role of Computers in the Analysis, Processing, Monitoring & Control and image reconstruction in bio-medical field.

UNIT-II

ECG: Measurement of Amplitude and Time Intervals, QRS Detection(Different Methods), ST Segment Analysis, Removal of Baseline Wander And Power line Interferences, Arrhythmia Analysis, Portable Arrhythmia Monitors.

UNIT-III

Data Reduction: Turning Point algorithm, AZTEC Algorithm, Fan Algorithm, Huffman and Modified Huffman Coding, Run Length Coding.

UNIT-IV

EEG:Neurological Signal Processing, EEG characteristic, linear prediction theory, Sleep EEG, Dynamics of Sleep/Wake transition. Study of pattern of brain waves, Epilepsy-Transition, detection and Estimation. EEG Analysis By Spectral Estimation: The Bt Method, Periodogram, - Maximum Entropy Method & AR Method, Moving Average Method. The ARMA Methods, - Maximum Likelihood Method.

UNIT-V

EP Estimation: by Signal Averaging, Adaptive Filtering:- General Structures of Adaptive filters, LMS Adaptive Filter, Adaptive Noise Canceling, Wavelet Detection:- Introduction, Detection By Structural features, Matched Filtering, Adaptive Wavelet Detection, Detection of Overlapping Wavelets.

TEXT BOOKS

- Biomedical Digital Signal Processing, Willis J Tomkin, Phi.
- Biomedical Signal Processing, D.C Reddy McGrawhill
- Biomedical Instrumentation and Measurement.,Crommwell,Weibel and Pfeifer, PHI

REFERENCE BOOKS

- Biomedical Signal Processing, Arnon Cohen, volume I & Licrc Press
- 2 Biomedical Signal Analysis A Case Study Approach, Rangaraj M. Rangayyan, John Wiley and Sons Inc.
- Medical instrumentation Application and Design, john G. Webster, john Wiley & Sons Inc.

BTECE OE11 (PRINCIPLES OF MANAGEMENT)

Unit – I

MANAGEMENT: Concept, Nature, Importance; Management: Art and Science, Management As a Profession, Management Vs. Administration, Management Skills, Levels of Management, Characteristics of Quality Managers. Evolution of Management: Early contributions, Taylor and Scientific Management, Fayol's Administrative Management, Bureaucracy, Hawthorne Experiments and Human Relations, Social System Approach, Decision Theory Approach. Business Ethics and Social Responsibility: Concept, Shift to Ethics, Tools of Ethics.

Unit –II

INTRODUCTION TO FUNCTIONS OF MANAGEMENT PLANNING: Nature, Scope, Objectives and Significance of Planning, Types of Planning, Process of Planning, Barriers to Effective Planning, Planning Premises and Forecasting, Key to Planning, Decision Making. Organizing: Concept, Organization Theories, Forms of Organizational Structure, Combining Jobs: Departmentation, Span of Control, Delegation of Authority, Authority & Responsibility, Organizational Design.

Unit –III

STAFFING: Concept, System Approach, Manpower Planning, Job Design, Recruitment & Selection, Training & Development, Performance Appraisal Directing: Concept, Direction and Supervision Motivation: Concept, Motivation and Performance, Theories of motivation, Approaches for Improving Motivation, Pay and Job Performance, Quality of Work Life, Morale Building.

Unit –IV

LEADERSHIP: The Core of Leadership: Influence, Functions of Leaders, Leadership Style, Leadership Development. Communication: Communication Process, Importance of Communication, Communication Channels, Barriers to Communication. Controlling: Concept, Types of Control, Methods: Pre-control: Concurrent Control: Post-control, An Integrated Control System.

Unit –V

QUALITY: The Quality Concept Factors affecting Quality, Developing a Quality Control System, Total Quality Control, Pre-control of Inputs, Concurrent Control of Operations. Post Control of Outputs.

CHANGE AND DEVELOPMENT: Model for Managing Change, Forces for Change, Need for Change, Alternative Change Techniques, New Trends in Organizational Change.

TEXTBOOKS

- Stoner, Freeman & Gilbert, *Management*, 6th Edition, PHI.
- Koontz, *Principles of Management*, 1st Edition, TMH.

REFERENCE BOOKS

- Robbins & Coulter, *Management*, PHI, 8th Edition.

BTECE OE12 (FINANCIAL ACCOUNTING)

Unit-I

INTRODUCTION TO FINANCIAL ACCOUNTING: Introduction, importance & scope, limitations. Concepts & conventions- generally accepted accounting principles, Indian accounting standard-an overview, the accounting equation, nature of accounts & rules of debit & credit, recording transactions in general journal, cash book, sales book, sales returns book, purchase book, purchase returns book, ledger accounts, preparation of trial balance, opening, closing and adjustment entries, Preparation of Trading account, profit and loss account, Balance sheet.

Unit-II

Fixed Asset accounting (Accounting standard-10)

DEPRECIATION ACCOUNTING: Meaning and objectives of providing depreciation, Methods of recording depreciation, Methods of calculating depreciation charge, Change in method of calculating depreciation charge, Disposal of an asset, Depletion, Amortization and Obsolescence. Accounting standard-06.

Unit-III

Accounting for inventory (Accounting Standard-02)

CASH FLOW AND FUNDS FLOW STATEMENTS: Introduction to corporate finance statements and Annual Report (overview of contents).

Unit-IV

COMPUTERIZED ACCOUNTS: Creation of vouchers & recording transactions

Unit -V

PREPARING REPORTS: cash book, ledger accounts, trial balance, income statement and balance sheet by using a reputed accounting software package.

TEXTBOOKS

- T. P. Ghosh, *Financial Accounting for Managers*, Taxmann Publications.
- N. Balwani , *Accounting & Finance for Managers*”, Excel Books.

REFERENCE BOOKS

- A. Gupta, *Financial Accounting for Management*, 4th Edition, Pearson.
- R.L.Gupta & V.K.Gupta, *Principles & practices of Accountancy*, Sultan Chand & Sons.

BTECE OE14 (OPERATIONAL RESEARCH)

Unit-I

INTRODUCTION: Definition and scope of operations research (OR), OR model, solving the OR model, art of modelling, phases of OR study.

LINEAR PROGRAMMING: Two variable Linear Programming model and Graphical method of solution, Simplex method, Dual Simplex method, special cases of Linear Programming, duality, sensitivity analysis.

Unit-II

TRANSPORTATION PROBLEMS: Types of transportation problems, mathematical models, transportation algorithms.

ASSIGNMENT: Allocation and assignment problems and models, processing of job through machines.

Unit-III

NETWORK TECHNIQUES: Shortest path model, Max-Flow problem and Min-cost problem.

PROJECT MANAGEMENT: Phases of project management, guidelines for network construction, CPM and PERT.

Unit-IV

THEORY OF GAMES: Rectangular games, Minimax theorem, graphical solution of $2 \times n$ or $m \times 2$ games, game with mixed strategies, reduction to linear programming model.

QUALITY SYSTEMS: Elements of Queuing model, generalized poisson queuing model, single server models.

Unit-V

INVENTORY CONTROL: Models of inventory, operation of inventory system, quantity discount.

TEXTBOOKS

- Wayne L. Winston, *Operations Research*, Thomson Learning, 2003.
- Hamdy H. Taha, *Operations Research-An Introduction*, Pearson Education, 2003.

REFERENCE BOOKS

- R. Panneer Seevam, *Operations Research*, PHI Learning, 2008.
- V. K. Khanna, *Total Quality Management*, New Age International, 2008.

BTECE OE21 (ORGANIZATIONAL BEHAVIOUR)

Unit – I

FOCUS AND PURPOSE: Definition, need and importance of organizational behaviour, Nature and scope, Frame work, Organizational behaviour models.

Unit – II

INDIVIDUAL BEHAVIOUR: Personality: types, Factors influencing personality, Theories, Learning: Types of learners, The learning process, Learning theories, Organizational behaviour modification. Misbehaviour: Types, Management Intervention. Emotions: Emotional Labour, Emotional Intelligence, Theories. Attitudes: Characteristics, Components, Formation, Measurement, Values. Perceptions: Importance, Factors influencing perception, Interpersonal perception, Impression Management. Motivation: importance, Types, Effects on work behaviour

Unit – III

GROUP BEHAVIOUR: Organization structure, Formation, Groups in organizations, Influence, Group dynamics, Emergence of informal leaders and working norms, Group decision making techniques, Team building , Interpersonal relations, Communication, Control.

Unit – IV

LEADERSHIP AND POWER: Meaning, Importance, Leadership styles, Theories, Leaders Vs Managers, Sources of power, Power centres, Power and Politics

Unit – V

DYNAMICS OF ORGANIZATIONAL BEHAVIOUR: Organizational culture and climate: Factors affecting organizational climate, Importance. Job satisfaction: Determinants, Measurements, Influence on behaviour. Organizational change: Importance, Stability Vs Change, Proactive Vs Reaction change, the change process, Resistance to change, Managing change. Stress: Work Stressors, Prevention and Management of stress, Balancing work and Life. Organizational development: Characteristics, objectives, Organizational effectiveness

TEXTBOOKS

- Stephen P. Robins, *Organizational Behavior*, PHI Learning / Pearson Education, 2008.
- Fred Luthans, *Organizational Behavior*, 11th Edition, TMH, 2001.

REFERENCE BOOKS

- Schermerhorn, Hunt and Osborn, *Organizational Behavior*, 9th Edition, John Wiley.
- Udai Pareek, *Understanding Organizational Behaviour*, 2nd Edition, Oxford Higher Education, 2004.
- Mc Shane & Von Glinov, *Organizational Behaviour*, 4th Edition, TMH, 2007.
- Hellrigal, Slocum and Woodman, *Organisational Behavior*, 11th Edition, Cengage Learning, 2007.
- Ivancevich, Konopaske & Maheson, *Organizational Behaviour & Management*, 7th Edition, TMH, 2008.

BTECE OE22 (CUSTOMER RELATIONSHIP MANAGEMENT)

Unit-I

INTRODUCTION: Definition, Need for CRM, Complementary Layers of CRM, Customer Satisfaction, Customer Loyalty, Product Marketing, Direct Marketing.

Unit -II

CUSTOMER SATISFACTION: Meaning, Definition, Significance of Customer Satisfaction, Components of Customer Satisfaction, Customer Satisfaction Models, Rationale of Customer Satisfaction, Measuring Customer Satisfaction.

Unit-III

SERVICE QUALITY: Concept of Quality, Meaning and Definition of Service Quality, Factors influencing customer expectation and perception, Types of Service Quality.

Unit -IV

CRM (TECHNOLOGY DIMENSIONS): E- CRM in Business, CRM: A changing Perspective, Features of e-CRM, Advantages of e-CRM, Technologies of e-CRM, Voice Portals, Web Phones, BOTs, Virtual Customer Representative.

Unit -V

CRM (EMERGING PERSPECTIVES): Employee-Organisation Relationship, Employee-Customer Linkage, Factors effecting employee's customer oriented behavior, Essentials of building employee relationship, Employee customer orientation.

TEXTBOOKS

- Alok Kumar Rai, *Customer Relationship Management: Concepts and Cases*, 2nd Edition, PHI Learning.
- Simon Knox, Adrian Payne, Stan Maklan, *Customer Relationship Management*, Routledge Inc.
- Bhasin, *Customer Relationship Management*, Wiley Dreamtech.

REFERENCE BOOKS

- Dyche, *Customer relationship management handbook*, PHI.
- Kristin Anderson, Carol Kerr, *Customer relationship management*, TMH.

BTECE OE23 (MANAGING AND MARKETING TECHNOLOGY)

Unit-I

Core Concepts of Marketing: Concept, Meaning, definition, nature, scope and importance of marketing, Approaches to Marketing: Product , Production , Sales, Societal, Relational. Concept of Marketing Myopia, Holistic Marketing Orientation, Customer Value, Adapting marketing to new liberalised economy - Digitalisation, Customisation, Changing marketing practices.

Unit-II

Market Analysis and Selection: Nature and Contents of Marketing Plan, Marketing environment, Controllable and Uncontrollable factors effecting marketing decisions, Analyzing latest trends in Political, Economic, Socio-cultural and Technical Environment, Concept of Market Potential & Market Share, Concept, Characteristics of consumer and organizational markets, Buyer Behavior, concept of market segmentation, Evaluating & Selecting, Target Markets, Concept of Target Market, Positioning and differentiation strategies, Concept of positioning – Value Proposition & USP, Marketing Information System, Strategic marketing planning and organization.

Unit-III

Product Decision- Concept of a product; Classification of products; Major product decisions; Product line and product mix; Branding; Packaging and labeling; Product life cycle – strategic implications; New product development and consumer adoption process.

Unit-IV

Price Decision- Concept, and Meaning of Price and Pricing, Significance of Pricing Decision, Factors affecting price determination; Pricing Methods and Techniques, Pricing policies and strategies; Discounts and rebates.

Unit-V

Place Decision- Nature, functions, and types of distribution channels; Distribution channel intermediaries; Channel management decisions, Marketing channel system - Functions and flows; Channel design, Channel management - Selection, Training, Motivation and evaluation of channel members; Promotion Decision-Communication Process; Promotion mix – advertising, personal selling, sales promotion, publicity and public relations; Media selection; Advertising effectiveness; Sales promotion – tools and techniques.

TEXTBOOKS

- Philip Kotler-Agnihotri, *Principle of marketing*, Pearson Education
- Ramaswamy V.S. and Namakumari S, *Marketing Management: Planning, Implementation and Control* , 3rd Edition, Macmillian.
- Rajan Saxena, *Marketing Management*, TMH.

REFERENCE BOOKS

- R Kumar & Goel, *Marketing Management*, UDH Publishers, 2013.
- Stanton William J, *Fundamentals of Marketing* , TMH.
- M.J. Etzel, B.J. Walker and William J Stanton, *Marketing concept & Cases*, 13th Edition, TMH.

BTECE OE24 (KNOWLEDGE MANAGEMENT)

Unit-I

INTRODUCTION: Definition, evolution, need, drivers, scope, approaches in Organizations, strategies in organizations, components and functions, understanding knowledge; Learning organization: five components of learning organization, knowledge sources, and documentation.

Unit-II

ESSENTIALS OF KNOWLEDGE MANAGEMENT: knowledge creation process, knowledge management techniques, systems and tools.

Unit-III

ORGANIZATIONAL KNOWLEDGE MANAGEMENT: architecture and implementation strategies, building the knowledge corporation and implementing knowledge management in organization.

Unit-IV

Knowledge management system life cycle, managing knowledge workers, knowledge audit, and knowledge management practices in organizations, few case studies.

Unit-V

Futuristic KM: Knowledge Engineering, Theory of Computation, Data Structure.

TEXTBOOKS

- A Thohothathri Raman, *Knowledge Management - a resource book*, Excel, 2004.
- Elias M. Awad Hasan M. Ghazri, *Knowledge Management*, Pearson Education

REFERENCE BOOKS

- Amrit Tiwana , *The KM Toolkit – Orchestrating IT, Strategy & Knowledge Platforms*, 2nd Edition, PHI.
- Sudhir Warier, *Knowledge Management*, Vikas Publications.

BTECE OE31 (ENTERPRISE RESOURCE AND PLANNING)

Unit-I

INTRODUCTION : ERP: An Overview, Enterprise – An Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, OLAP, SCM.

Unit-II

ERP IMPLEMENTATION: ERP Implementation Lifecycle, Implementation Methodology, Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring.

Unit-III

THE BUSINESS MODULES: Business modules in an ERP Package, Finance, Manufacturing, Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution.

Unit-IV

THE ERP MARKET: ERP Market Place, SAP AG, Peoplesoft, Baan, JD Edwards, Oracle, QAD, SSA

Unit-V

ERP – PRESENT AND FUTURE: Turbo Charge the ERP System, EIA, ERP and e-Commerce, ERP and Internet, Future Directions.

TEXTBOOK

- Alexis Leon, *ERP Demystified*, Tata McGraw Hill, New Delhi, 2000.

REFERENCE BOOKS

- Joseph A Brady, Ellen F Monk, Bret Wagner, *Concepts in Enterprise Resource Planning*, Thompson Course Technology, USA, 2001.
- Vinod Kumar Garg and N K Venkitakrishnan, *Enterprise Resource Planning – Concepts and Practice*, PHI, 2003.

BTECE OE32 (IPR AND CYBER LAWS)

Unit-I

FUNDAMENTALS OF CYBER SECURITY : Introduction-Cyber Security and its problem-Intervention Strategies: Redundancy, Diversity and Autarchy.

Unit-II

ISSUES IN CYBER SECURITY: Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right-source of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Loss.

Unit-III

INTELLECTUAL PROPERTY RIGHTS: Copy Right-Source of risks, Pirates, Internet Infringement, Fair Use, postings, Criminal Liability, First Amendments, Losing Data, Trademarks, Defamation, Privacy-Common Law Privacy, Constitutional law, Federal Statutes, Anonymity, Technology expanding privacy rights.

Unit-IV

PROCEDURAL ISSUES: Duty of Care, Criminal Liability, Procedural issues, Electronic Contracts & Digital Signatures, Misappropriation of information, Civil Rights, Tax, Evidence.

Unit-V

LEGAL ASPECTS OF CYBER SECURITY: Ethics, Legal Developments, Late 1990 to 2000,Cyber security in Society, Security in cyber laws case. studies, General law and Cyber Law-a Swift Analysis.

TEXTBOOKS

- Chris Reed and John Angel, *Computer Law*, OUP, New York, 2007.
- Justice Yatindra Singh, *Cyber laws*, Universal Law publishing Co, New Delhi, 2012.

REFERENCE BOOKS

- Jonathan Rosenoer, *Cyber Law: The law of the Internet*, Springer-Verlag, 1997.
- Mark F Grady, Fransesco Parisi, *The Law and Economics of Cyber Security*, Cambridge University Press, 2006.

BTECE OE33 (ANDROID BASED APP DEVELOPMENT)

Unit-I

INTRODUCTION: Introduction to Mobile Computing, Introduction to Android Development Environment.

FACTORS IN DEVELOPING MOBILE APPLICATIONS: Mobile Software Engineering, Frameworks and Tools, Generic UI Development, Android User.

Unit-II

APPLICATION FUNDAMENTALS: App Components, The Manifest File, App Resources, Device Compatibility, Security Architecture, Application Signing, User IDs and File Access, Using Permissions, Normal and Dangerous Permissions

Unit-III

APP COMPONENTS: Intent, Intent Types, Building an Intent, explicit intent, implicit intent, Receiving an Implicit Intent, Activities, Services, App Widgets

Unit-IV

APP RESOURCES & GUI: Providing Resources, Accessing Resources, Resource Types, User Interface, User Interface Layout, Input Controls, Input Events, Event Listeners, Event Handlers, Touch Mode, Handling Focus

Unit-V

MEDIA AND CAMERA: Capturing Photos, Managing Audio Playback

LOCATION AND SENSORS APIs: Location Services, Google Maps Android API, Introduction to Sensors, Identifying Sensors and Sensor Capabilities, Monitoring Sensor Events

TEXBOOKS

- Dawn Griffiths & David Griffiths, *Head First Android Development*, O'Reilly.
- Reto Meier, *Professional Android 2 Application Development*, Wrox.

REFERENCE BOOK

- Mark L. Murphy, *Beginning Android 2*, Apress.

BTECE OE34 (ENGINEERING ECONOMICS)

Unit-I

INTRODUCTION TO ENGINEERING ECONOMICS AND MANAGERIAL ECONOMICS:

Concept of Efficiency, Theory of Demand , Elasticity of Demand, Supply and Law of Supply indifference Curves, Budget Line, Welfare Analysis, Scope of Managerial Economics, Techniques and Applications of Managerial Economics.

Unit-II

MARKET STRUCTURE: Perfect Competitions Imperfect- Monopolistic, Oligopoly, duopoly sorbent features of price determination and various market conditions.

Unit-III

DEMAND FORECASTING AND COST ESTIMATION: Characteristics of Forecasts, Forecasting Horizons, Steps to Forecasting, Forecasting Methods, Seasonal Adjustments, Forecasting Performance Measures, Cost Estimation, Elements of cost, Computation of Material Variances Break-Even Analysis.

Unit-IV

MANAGEMENT ASPECTS: Functions of Management, Project Management, Value Engineering, Project Evaluation, Decision Making.

TEXTBOOKS

- G. J. Thuesen, & W.J. Fabrycky, *Engineering Economy*, PHI, New Delhi.
- William G. Sullivan, James A. Bontadelli & Elin M. Wicks, *Engineering Economy*, First Indian reprint, Pearson Education Asia.

REFERENCE BOOKS

- Donald G. Newnan, Jerome P. Lavelle & ted G. Eschenbach, *Engineering Economic Analysis*, Engineering press, Austin, Texas.
- Seema Singh, *Economics for Engineering Students*, IK International Publishing House Pvt. Ltd.

BTECE OE41 (OPERATING SYSTEM)

Unit-I

INTRODUCTION: Operating Systems functions, Types of operating systems, Multiprogramming systems, Batch systems, Time-sharing systems, Operating system operations, Special purpose operating systems, Distributed systems, Different computing environments.

OPERATING SYSTEM ORGANIZATION: Processor and user modes, user operating system interface, Kernels, System calls and its types, System programs, Operating system structures, Virtual machines.

Unit-II

CONCURRENT PROCESSES: Process concept, Principle of Concurrency, Producer Consumer Problem, Critical Section problem, Semaphores, Classical problems in Concurrency, Inter Process Communication, Process Generation, Process Scheduling.

CPU SCHEDULING: Scheduling Concept, Performance Criteria Scheduling Algorithm, Evolution, Multiprocessor Scheduling.

Unit-III

DEADLOCK: System Model, Deadlock Characterization, Prevention, Avoidance and Detection, Recovery from deadlock combined approach.

Unit-IV

MEMORY MANAGEMENT: Base machine, Resident monitor, Multiprogramming with fixed partition, Multiprogramming with variable partition, Multiple base register, Paging, Segmentation, Virtual memory concept, Demand paging, Performance, Paged replaced algorithm, Allocation of frames, Thrashing, Cache memory, Organization, Impact on performance.

Unit-V

I/O MANAGEMENT & DISK SCHEDULING: I/O devices and organization of I/O function, I/O Buffering, DISK I/O, Operating System Design Issues.

FILE SYSTEM: File Concept, File Organization and Access Mechanism, File Directories, File Sharing, Implementation Issues

TEXTBOOK

- A Silberschatz, P.B. Galvin & G. Gagne, *Operating Systems Concepts*, 8th edition, John Wiley Publications, 2008.

REFERENCE BOOKS

- G. Nutt, *Operating Systems: A Modern Perspective*, Pearson Education, 2nd edition, 1997.
- A.S. Tanenbaum, *Modern Operating Systems*, 3rd edition, Pearson Education, 2007.
- W. Stallings, *Operating Systems, Internals & Design Principles*, 5th edition, PHI, 2008.

BTECE OE42 (KNOWLEDGE BASED SYSTEMS AND ROBOTICS)

Unit-I

KNOWLEDGE BASED SYSTEMS: Uncertainty Handling using Fuzzy logic, Neural Networks, Swarm Intelligence.

Unit-II

ROBOT ELEMENTS: Drive system, control system, sensors, end effectors, gripper actuators and gripper design.

Unit-III

ROBOT COORDINATE SYSTEMS AND MANIPULATOR KINEMATICS: Robot co-ordinate system representation, transformation, homogenous transform and its inverse, relating the robot to its world. Manipulators Kinematics, parameters of links and joints, kinematic chains, dynamics of kinematic chains, trajectory planning and control, advanced techniques of kinematics and dynamics of mechanical systems, parallel actuated and closed loop manipulators.

Unit-IV

ROBOT CONTROL: Fundamental principles, classification, position, path velocity and force control systems, computed torque control, adaptive control, Serroo system for robot control, and introduction to robot vision.

Unit-V

ROBOT PROGRAMMING: Level of robot programming, language based programming, task level programming, robot programming synthesis, robot programming for welding, machine tools, material handling, assembly operations, collision free motion planning.

TEXTBOOKS

- Coifet Chirroza, *An Introduction to Robot Technology*, Kogan Page.
- Y. Koren, *Robotics for Engineers*, TMH.

REFERENCE BOOKS

- K. S. Fu, R.C. Gonzalez & C S G Lee, *Robotics*, TMH.
- J. J. Craig, *Robotics*, Addison-Wesley.

BTECE OE43 (JAVA PROGRAMMING)

Unit-I

Java Basics: Java and Internet, Difference between C++ and Java, Byte code and platform independence, Features of Java, Java 2 Standard Edition (J2SE), Java Runtime Environment (JRE), Java Just In Time (JIT) Compiler, Installing JDK, Compiling and executing Java Application, Java Program Structure, Java Keywords, Data types, Variables, Arrays, Expressions, Operators, Control Statements, for each statement, Command Line Arguments.

Unit-II

Object-Oriented Programming: Class and Encapsulation, Objects, Methods, Default and parameterized Constructors, Inheritance, super and this Keywords, Static Methods, Polymorphism, Overloading, Overriding, Dynamic Method Dispatch, Abstract class, final Keyword, Using Scanner Class for Formatted Input, Universal Superclass Object, Variable Argument List.

Unit III

Interface, Package and String: Interface and Multiple Inheritance, Package, Creating Package, Using Imports, static import, Access Controls, public, private, protected and default Control, String, Methods of String, toString() Method, StringBuffer and StringBuilder.

Unit-IV

Exception handling Multithreading: Exception, try and catch Statement, Multiple catch Statements, Nested try Statement, throw, throws and finally Statements, Creating Exception Subclasses, Thread, Advantages of Thread, Creating Threads by Extending Thread Class and Implementing Runnable Interface, Creating Multiple Threads, Life Cycle of a Thread, Thread Priorities, Thread Synchronization.

Unit-V

GUI Programming: Applet and AWT Basics, Applet Vs. Application, Applet Life Cycle, Passing Parameters to Applets, Drawing Line, Rectangle, Ellipse and Arc, Font and Color Class, Frame, FlowLayout, BorderLayout and GridLayout Manager, Delegation Event Model, Listeners, Action and Item Events, Handling Mouse and Keyboard Events, Using Components, Text Field, Label, Button, Choice, List.

TEXT BOOKS

- Herbert Schildt, Java: The Complete Reference, Seventh Edition, DEC-06, ISBN: 9780072263855
- Joel Murach and Andrea Steelman, Murach's Java SE 6, ISBN-10: 1-890774-42-1; ISBN-13: 978-1-890774-42-4

REFERENCE BOOKS

- Katherine Sierra, Kathy Sierra, Bert Bates, SCJP Sun Certified Programmer for Java 6 Study Guide: Exam (310-065), McGraw-Hill Companies, June 2008, ISBN-13: 9780071591065
- Jeff Friesen, Beginning Java SE 6 Platform: From Novice to Professional, Apress
- Deital and Deital, Java How to Program, 8/e, Prentice Hall, 03/17/2009, ISBN: 0136123716
- Khalid Mughal, Rolf Rasmussen, A Programmer's Guide to Java SCJP Certification: A Comprehensive Primer, 3/e, ISBN: 0321556054

BTECE OE44 (WEB PROGRAMMING)

Unit-I

EMERGENCE OF THE INTERNET: Terminology, Accessibility: Language & Connectivity, Services of the Internet: E-Mail, World Wide Web (WWW), Remote Access, Collaboration, File Sharing, Internet Telephony; Use & Culture: Usenet, From gopher to WWW, Search Engines: Wais, Archie, Web Search Engine.

Unit-II

HTML & DHTML: HTML Basics, HTML Text, HTML Lists, HTML Images, HTML Links, HTML Backgrounds, HTML Tables, HTML Frames, HTML Forms

Unit-III

Introduction, CSS Selectors, Where To Place It, CSS Text, CSS Colors, CSS Links, CSS Lists, CSS Layers, CSS Cursors

Unit-IV

JavaScript: JavaScript Basics, Animated Buttons, Browser Detection, Cookies, Popup Windows, Drop Down Menu, Form Validation, Frameset Script, Multiple Link

Unit-V

XML: XML Basics, Creating XML Documents, DTD Basics, XML Schema Basics, XML Schema Data Types, XSLT Basics, The XSLT Stylesheet and XPath, XSLT Functions, XML Namespaces

TEXTBOOKS

- Stephen Holzner, *HTML Black Book*, Wiley Dreamtech.
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