SRI CHANDRASEKHARENDRA SARASWATHI VISWA MAHAVIDYALAYA UNIVERSITY

(University Established under section 3 of UGC Act 1956)

Enathur, Kanchipuram - 631561

CURRICULAM FOR

B.E (Electronics & Communication Engineering)

PART TIME PROGRAMME

CHOICE BASED CREDIT SYSTEM

(For Candidates admitted from the year 2008 onwards)

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

CHOICE BASED CREDIT SYSTEM FOR BE (ECE) PART TIME PROGRAMME

DURATION OF THE PROGRAMME

A student is normally expected to complete BE Part Time Programme in Three and Half years but in any case not more than Six years from the time of admission.

ASSESSMENT

The break – up of assessment and examination marks for the theory subjects is as follows:

First Assessment	: 15 marks
Final Assessment	: 15 marks
Assignments	: 10 marks
Examination	: 60 marks

The break – up of assessment and examination marks for the Practical subjects is as follows:

First Assessment (Test)	: 15 marks
Final Assessment (Test)	: 15 marks
Maintenance of record book	: 10 marks
Examination	: 60 marks

The project work will be assessed for 100 marks by the committee, consisting of the guide and a minimum of two members nominated by the head of the department.

One of the committee members will be nominated as the chairman by the head of the department. The head of the department may himself be a member or the chairman. 100 marks are allotted for the project work and viva voice examination at the end of the semester.

ATTENDANCE REQUIREMENTS

To be eligible to appear for the examination in a particular course, a student must put in minimum of 80% in the course. However, if the attendance is 70% or above but less than 80% in any course, the authorities can permit the student to appear for the examination in the course on payment of the prescribed condonation fees.

A student who withdraws from or does not meet the minimum attendance requirement in course must re-register for and repeat the course.

PASSING AND DECLARATION OF EXAMINATION RESULTS

All assessments of all the courses on absolute marks basis will be considered and passing by the results passing board in accordance with the rules of the university. Thereafter, the controller of examinations shall convert marks for each course to the corresponding letter grade as follows, Compute the grade point average and cumulative grade point average, and prepare the grade cards.

90 to 100 marks	: Grade 'S'
80 to 89 marks	: Grade 'A'
70 to 79 marks	: Grade 'B'
60 to 69 marks	: Grade 'C'
55 to 59 marks	: Grade 'D'
50 to 54 marks	: Grade 'E'
Less than 50 marks	: Grade 'F'
Insufficient Attendance	: Grade 'I'
Withdrawn from course	: Grade 'W'

A student who obtains less than 24 marks out of 60 in the examination or is absent for the examination will be awarded grade 'F'.

A student who earns a grade of S, A, B, C, D, or E for a course is declared to have successfully completed that course and earned credits for that course. Such a course cannot be repeated by the student.

A student who obtains letter grade F in a course has to reappear for the examinations in that course.

A student who obtains letter grade I or W in a course has to re – register for and repeat the course.

The following grade points are associated with each letter grade for and repeat the point average and cumulative grade point average.

S –10; A – 09; B – 08; C – 07; D – 06; E – 05; F – 0.

Course with grades I and W are not considered for calculation of grade point average or cumulative grade point average. F grade will be considered for computing GPA and CGPA.

A student can apply for re – totaling for one or more of his examination answer papers within a week from the date of issue of the grade sheet to the students on payment of prescribed fee per paper. The application must be made to the controller of Examinations with the recommendation of the head of the department.

After results are declared, grade cards will be issued to the students. The grade cards will contain the list of courses registered during the year / semester, the grades scored and the grade point average (GPA) for the year / semester.

GPA is the sum of the products of the number of credits of a course with the grade point scored in that course, taken over all the courses for the year/ semester, divided by the sum of the number of credits for all courses taken in that year / semester. CGPA is similarly calculated considering all the courses taken from the time of admission.

After successful completion of the programme, the degree will be awarded with the following classification based on CGPA.

For First Class with Distinction, the student must pass all the courses in the first attempt and obtain a CGPA OF 8.25 or above.

For First Class, the student must obtain a CGPA of 6.5 or above.

For Second Class, the student must clear all the subjects with in six years from the date of admission.

COURSE CONTENT AND SCHEME OF EXAMINATION

CURRICULUM FOR BE (ECE) PART TIME (SEVEN SEMESTERS) PROGRAMME

AS ON APRIL 2008

(EFFECTIVE FOR BATCH (2008 – 12) ONWARDS)

SEMESTER I

SUB. CODE	SUBJECT	L	P	Credits (Units)
EBPL1FT081	Mathematics – I	3	-	3
EBPL1BT082	Circuit Analysis	3	-	4
EBPL1BT083	Electron Devices & Circuits	3	-	4
EBPL1HT084	Environmental Science & Engineering	3	-	3
EBPL1AP081	Object oriented Programming using C++ Lab	-	3	3
				TOTAL CREDITS: 17

SEMESTER II

SUB. CODE	SUBJECT	L	P	Credits (Units)
EBPL2FT081	Mathematics – II	3	-	3
EBPL2BT082	Electromagnetic theory	3	-	4
EBPL2BT083	Transmissions lines & Wave Guides	3	-	4
EBPL2BT084	Digital Electronics	3	-	4
EBPL2BP081	Electronics Lab - I	-	3	3
				TOTAL CREDITS: 18

SEMESTER III

SUB. CODE	SUBJECT	L	P	Credits (Units)
EBPL3FT081	Mathematics – III	3	-	3
EBPL3BT082	Analog Electronics	3	-	4
EBPL3BT083	Measurements & Instrumentation	3	-	4
EBPL3BT084	Principles of Management and professional ethics	3	-	3
EBPL3BP081	Electronics Lab - II	-	3	3
				TOTAL CREDITS: 17

SEMESTER IV

SUB. CODE	SUBJECT	L	P	Credits (Units)
EBPL4BT081	Microprocessor	3	-	4
EBPL4BT082	Digital signal processing	3	-	4
EBPL4BT083	Principles of communication	3	-	4
EBPL4BT084	Control systems	3	-	3
EBPL4BP081	Microprocessor and signal Processing Lab	-	3	3
				TOTAL CREDITS:18

SEMESTER V

SUB. CODE	SUBJECT	L	P	Credits (Units)
EBPL5BT081	Digital Communication	3	-	4
EBPL5BT082	Microcontroller	3	-	4
EBPL5BT083	Antenna & Propagation	3	-	4
EBPL5BT084	Broadcasting & Telecasting Systems	3	-	4
EBPL5BP081	Communication Lab	-	3	3
				TOTAL CREDITS: 19

SEMESTER VI

SUB. CODE	SUBJECT	L	P	Credits (Units)
EBPL6BT081	Microwave Engineering	3	-	4
EBPL6BT082	Optical Communication	3	-	4
EBPL6BT083	Telecommunication Switching systems	3	-	4
Refer Annexure	Elective-I	3	-	4
EBPL6BP081	Microwave & Optics lab	-	3	3
				TOTAL CREDITS: 19

SEMESTER VII

SUB. CODE	SUBJECT	L	P	Credits (Units)
EBPL7BT081	VLSI Design	3	-	4
Refer Annexure	Elective-II	3	-	4
Refer Annexure	Elective-III	3	-	4
EBPL7BP081	Project work	-	12	10
				TOTAL CREDITS: 22

TOTAL CREDIT OF THE COURSE = 130 UNITS

L – Lecture hours/week; P - Practical hours/week;

Duration of Examination = 3 Hours;

S.N	Mark particulars	Maximum Marks
1.	Internal Assessment Marks	40
2.	External Assessment Marks	60
Total Marks		100

LIST OF ELECTIVES (PART TIME)

VI Semester -Elective I	EBPL6BE084A	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS
	EBPL6BE084B	BIO-MEDICAL SIGNAL PROCESSING
	EBPL6BE084C	CODING THEORY AND CRYPTOGRAPHY.
	EBPL6BE084D	COMPUTER AIDED SYSTEM DESIGN
	EBPL6BE084E	COMPUTER ARCHITECTURE
VII Semester -Elective II	EBPL7BE082A	DATA COMMUNICATION NETWORKS
	EBPL7BE082B	DIGITAL IMAGE PROCESSING
	EBPL7BE082C	EMBEDDED SYSTEMS
	EBPL7BE082D	ENGINEERING ACOUSTICS
	EBPL7BE082E	SPEECH SIGNAL PROCESSING
VIII Semester -Elective III	EBPL7BE083A	MOBILE COMMUNICATIONS
	EBPL7BE083B	NEURAL NETWORKS AND FUZZY LOGIC
	EBPL7BE083C	PRINCIPLES OF NANO TECHNOLOGY
	EBPL7BE083D	RADAR AND NAVIGATIONAL AIDS
	EBPL7BE083E	ROBOTICS
	EBPL7BE083F	SATELLITE COMMUNICATION

Department of Electronics & Communication Engineering

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **I**

Sub. Code: **EBPL1FT081** **Credit: 3**

(For students admitted from 2008-09 onwards)

Subject: MATHEMATICS - I

UNIT I [10 Hrs] INFINITE SERIES

Basic definition of Sequences - Series - Convergence - examples General properties – Series of positive terms - Comparison test - Ratio test - Cauchy's root test – Integral test – D'Alembert's ratio test. Alternating series: Leibnitz's rule.

UNIT –II [10 Hrs] MATRIX THEORY AND DIFFERENTIAL EQUATIONS

Types of matrices – eigenvalues and eigenvectors – properties – Cayley Hamilton theorem (without proof) – quadratic forms. Differential Equations: Linear equations of second order with variable coefficients, Method of reduction of order, Transformation of the equation by changing the dependent variable.

UNIT III [10 Hrs] (MULTIPLE INTEGRALS)

Double integrals - Change of order of integration - Double integrals in polar coordinates - Areas enclosed by plane curves - Triple integrals - Volume of solids - Beta function - Gamma function - Relation between beta and gamma functions.

UNIT IV [10 Hrs] (VECTOR CALCULUS)

Scalar and Vector point functions - Del applied to scalar point functions: Gradient - Del applied to vector point functions : Divergence and curl - Del applied twice to point functions - Del applied to products of point functions - Integration of vectors - Line integral - - Surface integral - Volume integrals.

UNIT V [10 Hrs] (APPLICATIONS OF VECTOR CALCULUS)

Green's theorem in the plane (without proof) - Stoke's theorem (without proof) - Gauss divergence theorem (without proof) - verification and applications.

TEXT BOOK

1.B.S.Grewal, Higher Engineering Mathematics, Thirty Sixth Edition, Khanna Publishers, New Delhi, 2002.

REFERENCES

1. Erwin Kreyszig, Advanced Engineering Mathematics, Eighth Edition, John Wiley & Sons, 1999.
2. D.W.Jordan, D.Smith, Mathematical Techniques, Second Edition, Oxford University Press, 1999.
3. Peter V.}. Neil, Advanced Engineering Mathematics, Third Edition, PWS Publishing Company, Boston, 1993.
4. C.Ray Wylie, Louis C. Barrett, Advanced Engineering Mathematics, Sixth Edition,
5. McGraw Hill Publishing Company, 1995.
6. D.A.Clarke, Mathematics for Engineering (An active learning approach), DP Publications Ltd., London, 1994.
7. Murry R. Spiegel, Mathematical Hand Book (For formulae and tables) (Schaum's Outline series), McGraw Hill Company, 1968.
8. Richard Bronson, Differential Equations, (Schaum's Outline Series), McGraw Hill Company, 1975.
9. Murry R. Spiegel, Vector Analysis, (Schaums Outline Series) McGraw Hill Company, 1974.
10. Venkataraman M.K., "Engineering Mathematics: First Year", The National Publishing Company, Chennai, 1998.
11. Veerarajan T., "Engineering Mathematics", Tata McGraw Hill Publishing Co., New Delhi, 1999.

Department of Electronics & Communication Engineering

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **I**

Sub. Code: **EBPL1BT082** **Credit: 4**

(For students admitted from 2008-09 onwards)

Subject: CIRCUIT ANALYSIS

Pre-requisite: knowledge of Ohm's Law and Engineering Mathematics (Calculus)
Objectives: To calculate V, I, P in a circuit and construct Filters and analyze time and frequency

UNIT - I [10 Hrs]

Circuit Analysis: Network graphs - concept of branch, link, tree and co-tree- Kirchoffs laws - matrix representation and solution of DC and AC networks -node and loop basis - dual networks - series and parallel resonance circuits - bandwidth and selectivity of resonant circuits.

UNIT - II [10 Hrs]

Network Theorems and Transformations: Voltage and current source transformations - star and delta transformations - Superposition. Reciprocity, substitution, Thevenin, Norton, and maximum Power transfer theorems - statements and applications.

UNIT - III [10 Hrs]

Response of Electric Circuits: Concept of complex frequency - pole - zero plots - frequency Response of RL and RLC series and parallel circuits - free response - step and sinusoidal responses - Natural frequency , damped frequency , damping factor

UNIT - IV [10 Hrs]

Coupled Circuits: Coupled circuits - coefficient of coupling - self and mutual Inductance's - analysis of coupled circuits - single and double tuned coupled circuits - coefficient of Critical coupling - analysis - frequency response of tuned coupled circuits

UNIT - V [10 Hrs]

Two- Port Network and Filters: Driving point and transfer impedances / admittances voltage and current ratios of two port networks - admittance, impedance, hybrid, transmission Parameters for two port networks - equivalent to pi & T networks- impedance matching - passive filter as a two port network - characteristics of ideal filer - low pass and high pass filters.

TEXT BOOKS:

1. Sudhakar & Shyammohan SP, "Circuits and Networks – Analysis and Synthesis", TMGH, 1995
2. Joseph Edminister: *Electric Circuits, Schaums outline Series.* 1983

REFERENCE BOOKS:

1. M.L.Soni and J.C. Gupta: *Electrical Circuits Analysis*, Dhanpat Rai and Sons, New Delhi, 1981
2. W.H. Hayt and J.E. Kemmerley: *Engineering Circuit Analysis* McGraw Hill, New York,1962.
3. Theodore F. Bogrart, Jr. *Electric Circuits*, Mac Millan/ McGraw Hill

Department of Electronics & Communication Engineering

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **I**

Subject code: **EBPL1BT083** **Credit: 4**

(For students admitted from 2008-09 onwards)

Subject: ELECTRON DEVICES AND CIRCUITS

Pre - requisite: Knowledge of Ohm's law, KVL, KCL and Engineering Mathematics
Objectives: To know about the characteristic of electronic device and construct amplifiers for Audio and Video application.

UNIT - I [10 HRS]

Junction Diodes: Energy-band diagram - pn junction - junction diode - volt - ampere characteristics - ratings - transition and diffusion capacitance's - varactor diode - avalanche and Zener, break down - Zener diode - tunnel diode - PIN diode - clipper and clamper circuits using diodes -photodiode - photovoltaic cell - LED and LCD - voltage multiplier circuit.

UNIT - II [10 HRS]

BJT,FET and SCR devices: Principle of transistor action - current components - cutoff, active and saturation regions - CE, CB and CC configurations - - input and output characteristics – Construction, operation and characteristics of FET, MOSFET, UJT, SCR, DIAC, TRIAC.

UNIT-III [10 HRS]

Biasing and Stabilization: Types of transistor biasing, operating point, Fixed bias, Emitter bias, Voltage divider bias, Bias stabilization. Thermal runaway problem, Use of heat sinks.

UNIT-IV [[10 HRS]

Small signal Low frequency analysis: Two port device and hybrid model, h parameter model for BJT - evaluation of h parameters from characteristics - Analysis of transistor amplifiers using h-parameters(CE configuration), Simplified hybrid model of CE, CC and CB configurations.

UNIT-V [10 HRS]

Frequency response of amplifiers: Frequency response of RC coupled amplifiers - Low frequency response, effects of coupling and by - pass capacitors. Amplifiers at high frequencies. Miller effect and capacitance. Emitter - follower at high frequencies. ' Gain - band width ' product. FET Amplifiers at low and high frequencies. Multistage Amplifiers-Darlington pair and cascade Amplifiers

TEXT BOOK:

1. Millman & Halkias, “Integrated Electronics”, Mc Graw Hill, 1994.

REFERENCE BOOK:

1. Ben. G. Streetman: Solid-state electronic devices, Prentice Hall of India, 1986.
2. GK Mithal: Electronic Devices and Circuits, Khanna Publishers. Vol 1 1997.

Department of Electronics and Communication

Course **: BE (PART –TIME)** Branch: **ECE** Semester: **I**
Sub. Code: EBPL1HT084 **Credit: 3**
(For students admitted from 2008 - 09 onwards)

Subject**: ENVIRONMENTAL SCIENCE & ENGINEERING**

UNIT – 1 [10 HRS]

Introduction to Environmental Studies:

Resources – Natural, Forest, Water Resources – Wet Lands, Water Conservation & Utilization, Mineral Resources – Strategic Minerals & Metals – Environmental Impact of Mine Wastes – Food – Modern Agricultural Development – Harmful Effects of Pesticides, Energy – Distribution & Calculation, Land Source. Environmental awareness – Response to Challenges: Eco System – Concept, Energy Flow, Biogio Chemical Cycles – Hydro logical, Nitrogen, Oxygen, Carbon, phosphate, Sulphur Cycles.

UNIT – II [10 HRS]

Biodiversity:

Biodiversity – Introduction, Classification of Biodiversity, Value of Biodiversity – Drugs & Medicines: Biodiversity at Local National & Global Level – Endangered Species – Threats to Biodiversity – Habitat Destruction, Fragmentation, Man - Wild Conflict.

UNIT – III [10 HRS]

Challenges to Eco System:

Natural Disasters – Floods – Cyclones – High-Tides – Earth Quakes – Land Slide, Man Made Disasters – Definition, Causes, Effects of Air Pollution – Climate Change, Global Warming, Acid Rain, Ozone Depletion, Water Pollution – Soil, Marine, Noise, Thermal & Nuclear Pollution – Nuclear Accidents.

UNIT – IV [10 HRS]

Disaster Control & Management:

Preventive Methods – Suitable Design of Dwellings & Buildings: Pollution Monitoring – BOD, COD, Suitable Analytical & Instrumental Methods to Monitor Air & Water Pollution; Noise Pollution – Acoustic Measurements Monitoring Radio Activities in Water & Atmosphere.

UNIT – V [10 HRS]

Social Issues & Environment:

Social Issues – Rain Water Harvesting, Water shed Management & Development – Waste Land reclamation; Environmental Protection Acts – Environmental Legislation in India – Issues Involved in enforcement of Environmental legislation.

Text Books:

1. Raman Sivakumar, "Introduction to Environmental Science and Engineering", Vijay Nicole Imprints pvt. Ltd., 2005.

Reference Books:

1. Anubha Kaushik and C.P.Kaushik, "Environmental Science and Engineering", New Age International Publishers, 2005.
2. N. Arunachalam, P. Karthikeyan, s. Shantha Kumar, "Environmental Science and Engineering", Charulatha Publications, 2005.

Department of Electronics and Communication

Course**: BE (PART –TIME)** Branch: **ECE** Semester: **I**

Sub. Code: EBPL1AP081 **Credit: 3**

(For students admitted from 2008-09 onwards)

Subject: OBJECT ORIENTED PROGRAMMING USING C++ LAB

1) a) Write a C ++ Program to illustrate Class & objects

   b) Write a C ++ Program to illustrate constructors and Destructors.

2) a) Write a C ++ Program to illustrate Inline functions

   b) Write a C ++ Program to illustrate overloaded constructors

3) Write a C ++ Program to demonstrate the use multiple overloading

4) Write a C ++ Program to demonstrate the use of this pointer

5) Write a C ++ Program to enter the records of n number of students and then display them using nested structure.

6) Write a C ++ Program to illustrate the use of friend class.

7) Write a C ++ Program to demonstrate the use of multiple inheritance.

8) Write a C ++ Program to demonstrate the use of multilevel inheritance

9) Write a C ++ Program to demonstrate the use of friend function

10) Write a C ++ Program to demonstrate the pure virtual function

11) Write a C ++ Program to demonstrate the use of unary operator over loading

12) Write a C ++ Program to demonstrate the use of binary operator over loading

Department of Electronics & Communication Engineering

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **II**

Sub. Code: **EBPL2FT081** **Credit: 3**

(For students admitted from 2008-09 onwards)

Subject: MATHEMATICS – II

UNIT – I [10 HRS] LAPLACE TRANSFORMS

Transforms of simple functions - Basic operational properties - Transforms of derivatives - Convolution theorem - Inverse transforms - Applications of Laplace transforms to linear ordinary differential equations.

UNIT – II [10 HRS] PARTIAL DIFFERENTIAL EQUATIONS

Formation - Solution of standard types of first order equation - Lagrange's Linear Equation - Homogeneous linear equations with constant coefficients –Rules for finding Complementary Function – Rules for finding Particular Integral – Working procedure to solve the equation.

UNIT – III [10 HRS] (DIFFERENCE EQUATIONS AND Z-TRANSFORMS)

Introduction - Definitions – Formation of difference equations. Z-Transforms: Definition – Some standard Z –transforms – Linear property – Damping rule – standard results – Shifting rules – Initial and final value theorems – Some useful inverse Z – transforms – Convolution theorem – Evaluation of inverse transforms – Application to difference equations.

UNIT – IV [10 HRS] COMPLEX INTEGRATION

Integration of complex functions – Cauchy's theorem – Cauchy's integral formula – Series of complex terms – Taylor's series – Laurent series – Zeros and Singularities of an analytic function – Residues – Residue theorem – Calculation of residues – Evaluation of real definite integrals.

UNIT - V[10 HRS] FOURIER SERIES AND TRANSFORMS

Dirichlet's conditions - General Fourier series - Half-range sine and cosine series - Parseval's identity. Fourier integral representation - Fourier transform pairs – Properties - Fourier Sine and Cosine Transforms - Transforms of simple functions -Transforms of derivatives - convolution integrals of Fourier.

TEXT BOOK:

1. B.S.Grewal, Higher Engineering Mathematics, Thirty Sixth Edition, Khanna Publishers, New Delhi, 2002.

REFERENCES:

1. Erwin Kreyszig, Advanced Engineering Mathematics, Eighth Edition, John Wiley & Sons, 1999.
2. C.Ray Wylie, Louis C. Barrett, Advanced Engineering Mathematics, Sixth Edition, McGraw Hill Publishing Company, 1995.
3. Joseph A. Edminister, Electric Circuits, (Schaum's Outline series), Second Edition, Tata McGraw Hill, 1996.
4. William H.Hayt, Jack.E.Kemmerly, Engineering Circuit Analysis, Fifth Edition, McGraw Hill Publishing Company.
5. Alan V. Oppenheim, Ronald W.Schafer, Discrete Time Signal Processing, Second Edition, Prentice Hall, New Jercy, 1999.
6. Ronald N.Bracewell, The Fourier transform and its applications, McGraw Hill Company, 1986.
7. John H.Mathews, Russel W. Howell, Complex Analysis for Mathematics and Engineering, Third Edition, Narosa Publishing House, 1998.
8. Murry R. Spiegel, Complex Variables, (Schaum's Outline Series), McGraw Hill 1981.
9. Murry R. Spiegel, Laplace Transforms, (Schaum's Outline Series), McGraw Hill Company, 1965.

Department of Electronics and Communication

Course: **BE (PART-TIME)** Branch: **ECE** Semester: **II**

Sub. Code: **EBPL2BT082** Credit: **4**

(For students admitted from 2008-09 onwards)

Subject: ELECTROMAGNETIC THEORY

Pre - requisite: Calculus, Ohm's law, KVL, KCL, Physics (optional)

Objectives: Calculate Electric field, Magnetic field, Radiated Power in current carrying wires and free space.

UNIT – I STATIC ELECTRIC FIELD [10 Hrs]

Review of vector analysis **-** Divergence and curl of vector fields – Divergence theorem – Stoke's theorem. Electric charge – Coulomb's law – Electric field intensity – Linear, surface and volume charge density. Electric flux density --Gauss law and its applications. Electric scalar potential and potential difference - Potential and field due to uniformly charged line, sheet between two co-axial cylinders between two conducting spherical shells – and due to electric dipole.

UNIT – II STATIC MAGNETIC FIELD [10 Hrs]

Magnetic flux - Magnetic flux density-Lorentz force equation for moving charge. Biot savart's law - Magnetic field intensity – Magnetic flux density and field intensity due to a finite wire -- Magnetic flux density and field intensity on the axis of a circular coil and solenoid. Force between current carrying wires – Torque on closed circuits. Ampere's law – Magnetic vector potential.

UNIT – III ELECTRIC AND MAGNETIC FIELD IN MATERIALS [10 Hrs]

Nature of dielectrics, materials — Electric polarization-- Boundary conditions between dielectrics. Dielectric strength and breakdown. Capacitance – capacitance of various geometries, overhead lines and underground cables. Electrostatic energy and energy density -- Faraday's law of electromagnetic induction – Inductor and Inductance of solenoids, toroids transmission lines and cable – Mutual inductance – Inductors in series and parallel – Energy density in magnetic field – Boundary conditions at magnetic surfaces.

UNIT IV ELECTROMAGNETIC WAVES [10 Hrs]

Maxwell's equations. Poynting vector and Poynting's theorem. Electromagnetic wave equation-- Wave equation for free space— Uniform plane waves—Wave equation for conducting medium— Wave propagation in a conducting medium —Skin effect —Polarization — Plane waves in lossy dielectrics

UNIT V TRANSMISSION AND REFLECTION OF PLANE WAVES [10 Hrs]

Reflection and transmission of waves at a perfect conductor for normal incidence and oblique incidence with perpendicular and parallel polarizations-- Reflection and transmission of waves at a perfect dielectric for normal incidence and oblique incidence with perpendicular and parallel polarizations–Total internal reflection – Brewster angle –Surface impedance.

TEXT BOOKS:

1. K.A. Gangadhar, "Field Theory", Khanna Publishers, Delhi, 11th edition, 1991.

REFERENCE BOOKS:

1. John d Kraus, 'Electromagnetics', McGraw Hill Boom Co., New York, Third Edition,1989.
2. Narayana Rao,"Elements of engineering Electromagnetic",4th edition, Prentice Hall Inc.1998.
3. William Hayt, "Engineering Electromagnetics", Tata McGraw Hill, 5th edition, 1992.
4. Edward C.Jordan and Keith G.Balmain, "Electromagnetic waves and radiating systems", Prentice Hall Inc., 1980.
5. M.N.O.Sadiku," Elements of engineering Electromagnetic", 3th edition, Oxford University Press.

Department of Electronics & Communication Engineering

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **II**

Subject code: **EBPL2BT083** **Credit: 4**

(For students admitted from 2008-09 onwards)

Subject: TRANSMISSION LINES & WAVEGUIDES

Pre - requisite: Circuit Theory.
Objectives: Analog Filter construction (base band), Impedance matching at radio frequencies.

UNIT – I [10 HRS]

Characteristic impedance and propagation constant of pure reactance networks- Transmission and attenuation bands, ladder networks as filters- classification of filter networks-Terminating half sections – Composite filters – Design procedure – Attenuation in filters – Lattice network as filter – Introduction to crystal filters.

UNIT – II [10 HRS]

Insertion loss and reflection factor: Attenuators – Equalizers. T section and π section - Twin T networks, Bridged T, parallel – T and Lattice networks. Network synthesis: Positive real function – properties – Brune 's positive real function – reactive networks.

UNIT – III [10 HRS]

Electrically short and long line concepts of Transmission line – Network with distribution constants – Relationship between the line parameters and the transmission constants. Transmission line equation – Infinite line – Propagation, attenuation and phase constants – Surge impedance – Termination, Reflection, reflection factor, standing waves, standing wave ratio.

UNIT – IV [10 HRS]

Characteristics – Distortion – Distortionless Transmission – Loading, Lumped and distributed loading – Characteristics – Standing wave – Input impedance with total and partial reflection lines as circuits and switching elements – Skin and proximity effects. Matching: Quarter wave transformers – Single and double stub matching – Smith charts - its derivation and use.

UNIT – V [10 HRS]

Wave Guides: TE waves in rectangular Wave-guides -TM waves in rectangular Wave-guides — Impossibility of TEM waves – wave and characteristic impedance – Transmission line analysis for Wave-guides – Attenuation factor and Q of Wave guide.

TEXT BOOKS:

1. Van Valkenburg, " Network Analysis " 3/e PHI
2. John. D.Ryder, " Networks lines and fields ", Prentice Hall of India

REFERENCEBOOKS:

1.Frankline F.Kuo, " Network Analysis and Synthesis ", Wiley Eastern Edition 2/e 1996
2.G.K.Mithal, " Network Analysis ", Khanna Publication 14 / e 1997
3.Umesh sinha,"Transmission lines and networks", Sathya prakasham publishers.5/e 2002

Department of Electronics and Communication

Course **: BE (PART-TIME)** Branch: **ECE** Semester: **II**

Sub. Code: **EBPL2BT084** **Credit: 4**

(For students admitted from 2008-09 onwards)

Subject**: DIGITAL ELECTRONICS**

Pre - requisite: Binary Mathematics

Objectives: To design circuits for digital - logistic applications, pulse generator, counting applications, ALU.

UNIT - I [10 HRS]

Number Systems and Codes: Review of binary, octal and hexadecimal representations of numbers and their conversions. Binary arithmetic's. Conversion algorithms. Weighted binary codes. Nonweighted binary codes. Error detecting and error correcting codes. Alphanumeric codes.

UNIT - II [10 HRS]

Digital Integrated Circuits: BJT as a switch , Logic Specifications – RTL, DTL, IIL, TTL Open Collector O/P, Totem Pole O/P, Tristate O/P, Schottky TTL gate, ECL, MOS, CMOS Logic – Comparison of Logic Families

UNIT - III [10 HRS]

Boolean Algebra: Introduction to Boolean algebra - AND, OR and NOT operations. Laws of Boolean algebra. Minimization of Boolean expression. Boolean expressions and logic diagrams. Universal building blocks. Negative logic.

Combinational Logic: Truth tables and maps. Sum of products and product of sums. Map reduction, Hybrid functions, Incompletely specified functions, Multiple - output minimization. Variable - entered maps, Tabular minimization.

UNIT - IV [10HRS]

Logic function Realization with MSI Circuits: Multiplexers - Demultiplexers, Arithmetic circuits, Adder, Subtractors (Half and Full), Number complements. decoders and code converters – BCD to Excess 3, Gray, Seven Segment Display Conversions – Parity Generators and Checkers

UNIT - V [10 HRS]

Synchronous sequential circuits: Basic latch circuits - Flip-flops, truth table and excitation table. Shift Registers. Synchronous counter design using [JK, T, D flip flops] Up-down counter. General BCD counter. Ring counters. Shift counters

TEXT BOOKS:

1. W.H. Gothmann:
2. *Electronics - An Introduction, Theory and Practice*, PrenticeHall of India. Second edition
3. M.Morris Mono – Digital Logic & Computer Design – PHI, II Edn, 1999.

REFERENCE BOOKS:

1 Charles H. Roth, "Fundamentals of Logic Design", Thompson Learning.

2.John. M. Yarbrough, Digital Logic: Application and design, Thomson Learning

4. T.L. Floyd: *Digital Fundamentals*, Prentice Hall of India.3/e
4. D.J. Comer: *Digital Logic and State Machine Design*, HOLT-SAUN-DERS.

Department of Electronics and Communication

Course**: BE (PART –TIME)** Branch: **ECE** Semester: **II**

Sub. Code: EBPL2BP081 **Credit: 3**

(For students admitted from 2008-09 onwards)

Subject: ELECTRONICS LAB – I

1. Characteristics of diodes [PN junction diode and Zener diode]
2. Input and Output characteristics of BJT
3. Characteristics of JFET.
4. Characteristics of UJT and SCR.
5. Diode – Clipper, Clamper.
6. RC Coupled Amplifier – Frequency Response.
7. Characteristics of Photo-diode and LED.
8. Study of Logic gates: AND, OR, NOT, NAND, NOR, EX-OR.
9. Construction of FFs (RS, JK, D, T)
10. Combinational logic circuits: Adder/Subtractor
11. Sequential logic circuits: Counters/ Registers/ Ring counters
12. Code converters (Binary to gray, BCD to Excess 3)

Department of Electronics & Communication Engineering

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **III**
Sub. Code: **EBPL3FT081** **Credit:3**

(For students admitted from 2008-09 onwards)

Subject: MATHEMATICS – III

UNIT I [10 HRS] (PROBABILITY THEORY)

Axioms of probability theory - Probability spaces - Joint and conditional probabilities - Independent events.

UNIT II [10 HRS] (RANDOM PROCESS)

Definitions - Basic concepts and examples - Stationary and ergodicity - Second order process - Weekly stationary processes - Covariance functions and their properties - Spectral representation - Weiner Kinchine theorem.

UNIT III [10 HRS] (SPECTRAL REPRESENTATION)

Linear operations - Gaussian processes - Poisson processes - Low pass and band pass noise representations.

UNIT IV [10 HRS] (MARKOV PROCESS)

Markov process – definition of markov chain – Chapman-Kolmogorov theorem – classification of states of a Markov Chain.

UNIT V [10 HRS] (NUMERICAL METHODS)

Beginning an iterative method – The method of successive bisection – the method of false position- Newton Raphson method - the method of successive approximation- comparison of iterative methods – gauss elimination method pivoting – Gauss-Jacobi iterative method – Gauss-siedel iterative method.

PRESCRIBED TEXT BOOK

1. Papoulis, Probability, Random Variables and Stochastic Processes, Second Edition, McGraw Hill.
2. Rajaraman. V., Computer Oriented Numerical Methods, PHI Edn.

REFERENCES

1. Kishore S. Trivedi, Probability and Statistics with Reliability, Queueing and computer Science Applications, Prentice Hall of India, 1996.
2. Richard Isaac, The Pleasures of Probibility, Springer Verlag, 1995.
3. Veerarajan, T., Probability, Statistics and Random Process, Tata McGraw Hill Publishing Co., New Delhi.
4. Grewal, B.S.Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2002.
5. Manivachagam,K. Vittal P.R. Engineering Mathematics, Margham Publications, Chennai 1998.
6. M.K. Venkataraman, Engineering Mathematics III a, Eleventh edition, The National publishing company, Chennai.1998.

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE** Semester: **III**

SubCode: **EBPL3BT082** **Credit: 4**

(For students admitted from 2008-09 onwards)

Subject**: ANALOG ELECTRONICS**

Pre - requisite: Electronic devices and circuits.
Objectives: To construct Wide band amplifiers and Oscillators for Radio frequencies.

UNIT-I [10 HRS]

Differential amplifiers and Op-amps: Differential amplifiers - CMRR, Transfer characteristics. Differential amplifier with constant current source. Differential amplifier using FETs – Op-amps-electrical characteristics of Op-amp-Specification of Op-amp-Linear Operations using Op-amp. Integrator and Differentiator, summer, Scaler, I to V, V to I Converters, Clipper, Clamper

UNIT-II [10 HRS]

Power amplifiers and Power supplies Classification-Class A, B, C, Class A –direct coupled, and transformer coupled amplifiers, push pull and Class B complementary symmetry amplifiers, Class AB and Class C amplifier. Half wave, full wave and bridge type rectifiers. ., ripple factor-rectification efficiency, Shunt capacitor filter. Shunt and series type regulators using BJT. Switched - mode power supplies(SMPS)

UNIT – III [10 HRS]

Feedback amplifiers: Concept of feedback, Effect of feedback on gain, stability, distortion and bandwidth – Input and output impedance - Basic feedback amplifier topologies – Practical feedback amplifier circuits and their analysis - Multistage feedback amplifiers.

UNIT – IV [10 HRS]

Oscillators: Barkhausen Criteria for oscillation, RC Oscillators - Phase shift and wein bridge oscillators, Hartley, colpitts and clapps oscillators, Tuned oscillators and crystal oscillator – frequency stability. **OP- Amp:** Schmitt Trigger, Astable Multivibrator, and triangular wave generator, sine wave Generator. **PLL** – Frequency translation, detection, multiplication. **IC 555** – Astable, Monostable.

UNIT – V [10 HRS]

Tuned and wide band amplifiers: Single tuned amplifiers-impedence matching to improve gain, Double tuned amplifiers – Synchronously tuned amplifiers – Gain BW product – Cascode amplifier.

TEXT BOOKS:

1. Donald L. Schilling and C. Belove: *Electronic Circuits - Discrete and Integrated*. III Edition McGraw Hill.

2.Millmain and Halkias, "Integrated Electronics", McGraw Hill, International Student edition,1993.

3. Linear Integrated Circuits by Rai Chowdry and Jain, 1999, wiley Eastern

REFERENCE BOOKS:

1. Millman and Grabel: *MicroElectronics*. McGraw Hill International Edition.
2. GK Mithal: Electronic Devices and Circuits, Khanna Publishers. Vol 1 1997

Department of Electronics and Communication

Course **:BE (PART - TIME)** Branch: **ECE** Semester: **III**
Sub. Code**: EBPL3BT083** **Credit: 4**

(For students admitted from 2008-09 onwards)

Subject: MEASUREMENTS AND INSTRUMENTATION

Pre - requisite: Ohm's Law, Calculus.
Objectives: To know about the usage of a spectrum of electronic instruments starting from basic ammeter (analog) to Digital logic analyser.

UNIT- I [10 HRS]

MEASUREMENT ERRORS:

Types of Errors, Accuracy, Precision, Reproducibility, Repeatability and Noise, Analog Instruments – Galvano Meter, D Arsonaval Galvaometer, Moving Coil Instruments, PMMC Ammeter, Voltmeter, Ohm Meter, Moving Iron Instruments, Induction and Electrodynamometer.

UNIT- II [10 HRS]

SENSORS AND TRNASDUCERS:

Classification of Transducers- Resistance, Transducers – Potmeter, Straingauges, Resistance Thermometers, Thermistor. Inductive Transducers: LVDT, RVDT,. Capacitive Transducers- Piezoelectric, Photoelectric transducers, Digital Transducers – Encoder, Shaft Encoder, Optical Encoder.

UNIT - III [10 HRS]

DIGITAL INSTRUMENTS:

Digital Voltmeter system, Digital Multi meter, Digital Frequency Meter System.

SIGNAL GENERATORS: LF Signal Generators, Function Generators, Pulse Generators, RF Signal Generators, Sweep Signal Generators, Sweep Frequency Generators, Frequency Synthesizers

UNIT - IV [10 HRS]

DATA DISPLAY AND RECORDING SYSTEM:

Oscilloscope: CRO – CRT, Deflection System, Specifications, Controls, Storage Oscilloscope, Digital Storage Oscilloscope, Sampling Oscilloscope.

Graphic Recording Instruments: Strip Chart Recorders, X_Y Recorder, Plotters.

UNIT - V [10 HRS]

WAVEFORM ANALYSING INSTRUMENTS:

Distortion Meter, Spectrum Analyser, Digital Spectrum Analyser,

Radio Receiver Measurement : Receiver Basics and Parameters, Measuring Sensitivity, Selectivity and Image Response.

TEXT BOOK:

1. Copper D: *Electronic Instrumentation and Measurement Techniques*, PHI

REFERENCE BOOKS:

1. A.K. Sawhney: *A Course in Electrical and Electronic Measurements and Instrumentation*.
2. Doeblin: *Measurement Systems - Application and Design*
3. David A Bell, "Electronic Instrumentation and Measurements" , PHI, II Edn, 2003.
4. Joseph J Carr, ""Elements of Electronic Instrumentation and Measurements, LPE, III Edn, 2003.
5. Jones L.D. and Foster ChinA.*:Electronic Instruments and Measurements*, John Wiley
6. *Barney G.C. Intelligent Instrumentation,*PHI

Department of Electronics and Communication

Course **: BE (PART –TIME)** Branch: **ECE** Semester: **III**

Sub. Code: EBPL3BT084 **Credit: 3**

(For students admitted from 2008 - 09 onwards)

Subject**: PRINCIPLES OF MANAGEMENT AND PROFESSIONAL ETHICS**

UNIT- I (10 HRS)

Introduction to Management:

Definition of Management, process of Management- Planning, Organizing, leading, Controlling

Classical Approach-Contribution. and Limitation, Management Science Approach,

Skills, Roles and Performance: Types of managers Managerial Skills,- Technical Skill, Analytical Skill

Decision Making skill, Human Relation skill, Communication skill.

Managerial Roles –Interpersonal Role, Informational Role, Decisional Role.

UNIT – II (10HRS)

Planning Function:

Elements of Planning-Objectives, Action, Resource, Implementation.

Managerial Decision Making: Types of Decision, Process of Decision Making, Decision Making-Certainty Condition, Uncertainity Condition, Selecting Alternative.

Managing Information System; Need for Decision Support System, MIS and DSS

Strategic Planning –Organizational Strategy, Business Portfolio Matrix.

UNIT –III (10HRS)

Organizing Function:

Organizational Structure- Job Design, Departmentation, Span of Control, Delegation of Authority, Decentralized authority, Chain of Command and Authority, Line and Staff concept Matrix organizational Design

UNIT –IV (10HRS)

Engineering Ethics:

Senses of 'engineering ethics' – variety of moral issues – types of inquiry – moral dilemmas – moral autonomy – kohlberg's theory – Gilligan's theory – consensus and controversy – professions and professionalism – professional ideas and virtues – theories about right action – self-interest – customs and religion – uses of ethical theories

UNIT – V (10HRS)

Engineer's responsibility for safety:

Safety and risk – Assessment of safety and risk – Risk benefit analysis – Reducing risk – The three mile Island and chenobyl case studies

Text Books:

1. Mike Martin & Roland schinzinger " Ethics in engineering" Mc Graw Hill 1996

2. Govindarajan M, Natarajan. S.Senthil kumar V.S, "Engineering Ethics", Prentice Hall of India,2004

Reference Books:

1. Charles D.Fleddermamm, "Engineering Ethics", pearson Hall(2004)
2. Charles E.Haris, Michael S.Protchard & Michael J.Rabins, " Engineering Ethics- concepts and cases", wadsworth Thompson Learning
3. Jhon R.Boartright, " Ethics and conduct of Business", Pearson Education(2003)
4. Edmund G.See bauer & Robert L.Bany, "Fundamental of ethics for scientists and Engineering", Oxford University.

Department of Electronics and Communication

Course**: BE (PART –TIME)** Branch: **ECE** Semester: **III**

Sub. Code: **EBPL3BP081** **Credit: 3**

(For students admitted from 2008-09 onwards)

Subject: ELECTRONICS LAB - II

DESIGNING, ASSEMBLING AND TESTING OF

1.HW and FW rectifiers with and without filters .

2. Voltage regulator -series and shunt type.

3. Voltage and current feedback amplifiers using BJT

4. RC Phase shift Oscillator/ Hartley oscillator using BJT

5. Power amplifier - class B.

6. Tuned Class C amplifier

7. Measurement using bridges (Wheat stone, Maxwell's, Schering's bridge)

8. Op – amp parameters measurement

9. OP- Amp – Amplifiers, Inverting, Non inverting, DAC, Integrators, Differentiator

10. Schmitt Trigger, Astable, Monostable Multivibrator using IC 741

11. IC 555 – Astable, Monostable Multivibrator

12. Frequency synthesizer using PLL

13. Study of CRO.

Department of Electronics & Communication Engineering

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **IV**
Subject code: EBPL4BT081 **Credit: 4**
(For students admitted from 2008-09 onwards)

Subject: MICROPROCESSOR

Pre - requisite: Digital Electronics.
Objectives: To design microprocessor based system.

UNIT – I [10 HRS]

8085 Microprocessor: Microprocessor 8085 architecture, Pin diagram and Signal description, Multiplexing and Demultiplexing of Address Bus, Addressing Modes, Instruction Classification, Instruction set, Timing diagram, Instruction Format, Simple Assembly Language Programs. Microprocessor 8085 Interrupt Process, Hardware and Software Interrupts.

UNIT – II [10HRS]

Peripheral Interface Chips: PPI (8255), Timer (8253), Programmable Interrupt Controller (8259), USART (8251), Keyboard Display Interface (8279), DMA Controller [8257].
Interface with 8085 Microprocessor: Interfacing memory devices, ADC, DAC and Stepper Motor.

UNIT – III [10 HRS]

8086 Microprocessor: Microprocessor 8086 architecture, Pin diagram and Signal description, Memory Segmentation, Minimum mode Operation and Maximum Mode Operation, Interrupt and Interrupt Service Routine.

UNIT – IV [10 HRS]

Programming of 8086 microprocessor: Addressing modes, Instruction Classification, Instruction Set, Instruction Format, Simple Assembly Language Programs – Arithmetic operations, Data transfer, String Manipulation, Searching and Sorting.

UNIT – V [10 HRS]

Advanced Microprocessors: Microprocessor 80286 – Internal Architecture, Real Addressing Mode, and PVAM Mode. Microprocessor 80386 – Internal Architecture, Real Addressing Mode, Protected Mode, Segmentation and Paging. Microprocessor 80486 – Internal Architecture. Pentium Processor – System Architecture.

TEXT BOOKS:

1.R.S.Gaonkar, Microprocessor Architecture, Programming and applications, Penram international publications Fourth Edition
2.A.K RAY & K.M. Bhurchandi, Advanced Microprocessor and Peripherals, Tata Mc Graw Hill Pub

REFERANCE BOOKS:

1. Mathur A.P, Introduction to Microprocessors, McGraw Hill.
2. Hall D.V.Microprocessors and interfacing, programming and Hardware, McGraw Hill Book Company, New York
3.Microprocessor Theory and Application –M.Raffiquzzaman
4..B.Ram, Fundamentals of Microprocessors and Microcomputers, Dhanpat Rai Publications

Department of Electronics and Communication

Course **: BE (PART TIME)** Branch: **ECE** Semester: **IV**
Sub. Code: EBPL4BT082 **Credit – 4**
(For students admitted from 2008-09 onwards)

Subject: DIGITAL SIGNAL PROCESSING

Pre - requisite: Signals and Systems.
Objectives: To construct Digital Filters and study of dsp processor for digital applications.

UNIT - I [10 HRS]

Signals and Systems Representation:
D.T. Signal Representation: Step, impulse, periodic, aperiodic signals.
D.T. System characterisation: LTI system, Difference equations, Block diagram representation of D.T. systems.

UNIT - II [10 HRS]

DFT and FFT: Discrete convolutions - Linear and circular. Discrete Fourier Transform [DFT] and its properties. Relationship between z - transform & L-Transform, DTFT and DFT. Introduction to radix-2 Fast Fourier Transform [FFT]. Decimation in-time radix-2 FFT. Decimation-in-frequency radix -2 FFT. Computation of Inverse DFT through FFT.

UNIT - III [10 HRS]

Digital Filters:
FIR Filters: Design using Fourier series method and Frequency sampling method,
Windows: Rectangular, Hamming, Hanning and Kaiser.
IIR Filters: Properties of Butterworth and Chebyshev, Design using impulse invariance method and Bilinear Transformation method.

UNIT - IV [10 HRS]

Finite Word-Length Effects in Digital Filters: Fixed-point arithmetic. Effect of Quantization of the input data due to finite word-length. Coefficient in accuracy. Product round off. Need for scaling. Zero - input limit-cycle oscillation. Limit cycle oscillations due to overflow of address. Table - look up implementation to avoid multiplication's.

UNIT - V [10 HRS]

ADSP – 2181 Family Processor: Core Architecture – Computational Units – ALU, MAC, Barrel Shifter & Program Sequencer – Buses – On-chip Peripherals, Serial Ports, Timer, DMA Ports – Instruction Sets – Simple Programs – Addition, Subtraction, Circular Addressing, ASK etc.

TEXT BOOK:

1. Digital Signal Processing – Nagoor Kani, RBA Publishing.
2. ADSP – 218X DSP Hardware Reference – Analog Devices Manual. First Edition. February 2001.

REFERENCE BOOKS:

1. Oppenheim and Schafer: *Digital Signal Processing* [PHI] 1994
2. Rabiner and Gold: *Digital Signal Processing - Theory and Applications* . [PHI] 2001
3. Antoniou: *Digital Filter Design*, TMH.2/e Stanley: *'Digital Signal Processing'*, RESTON

Department of Electronics and Communication

Course**: BE (PART - TIME)** Branch: **ECE** Semester: **IV**
Sub. Code: **EBPL4BT083** **Credit: 4**

(For students admitted from 2008-09 onwards)

Subject: PRINCIPLES OF COMMUNICATION

UNIT – I (10 HRS)

Amplitude Modulation : Amplitude Modulation – Spectrum, Modulation Index, Power Constant, Transmission Efficiency. Generation – High Level, Low Level, AM Transmitter, Modulation Techniques – Square Law – Collector Modulation, Demodulation – Square Law Detector, Envelope Detector. DSB-SC – Generation – Balanced Modulator, Demodulator – Synchronous Detection, QAM, Carrier acquisition, SSB-SC – Modulation, Hilbert Transform, Generation – Frequency Discriminator Method, Phase shift method, Demodulation of SSB-SC

UNIT – II (10 HRS)

Angle Modulation: Frequency Modulation, Relation between PM and FM, modulation Index, maximum Deviation, Power generation – Narrow Band FM, Wide Band FM, Varactor Diode Method, Armstrong Method, effect of MF on spectrum – Band width of FM, FM demodulator – Balanced slope Detector, Foster – Seely Detector, Pre-emphasis, De- emphasis. Comparison of AM, Angle Modulation and FM.

UNIT – III (10 HRS)

Receiver: Tuned Radio Frequency, Super Heterodyne Receiver, sensitivity, selectivity, Double Spotting, Tracking, Image Frequency Rejection, IF, Choice of IF, IF Amplifier. AGC, Delayed AGC. SSB Receiver, FM Receiver.

UNIT – IV (10 HRS)

Noise: Overview of communication system. Brief discussion of the origin and nature of various types of noise - Atmospheric noise, thermal noise – Equivalent Noise Bandwidth, shot noise, Partition Noise, Flicker Noise. Signal to Noise Ratio, S/N Multiple Stage, Noise Factor, Amplifier Input Noise, Noise in Amplifier in Cascade

UNIT – V (10HRS)

Information Theory: Measure of Information, Entropy, Information Rate, Redundancy, Source Coding, Coding Efficiency, Shannon – Fano Coding, Huffmann Coding.

TEXT BOOK:

1. D. Roody and J.C. Ceoolen: *Electronic Communications*. PHI, IV Edn, 2001
2. Sanjay Sharma: *Communication Systems (Analog and Digital)* :SKS&Sons II Edn 2004.

REFERENCE BOOKS:

1. F.E. Terman*: Electronic and Radio Engineering*. McGraw Hill.
2. Ziemer and Tranter: *Principles of Communication*, Houghton-Miffin
3. W.W. Mumford and E.H, Scheibe*: Noise Performance Factors in Communication System.* Artech..
4. L. Gray and R. Graham: *Radio Transmitters*.

Department of Electronics and Communication

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **IV**
Subject code: **EBPL4BT084** Credit: **3**

(For students admitted from 2008-09 onwards)

Subject: CONTROL SYSTEMS

UNIT – I [10 HRS]

Introduction: Open loop and closed loop systems. Basic elements – Analysis of physical systems – Mechanical, Electrical Systems- Mathematical Representation – Transfer function – Block diagrams – Signal flow graphs- Mason's gain formula.

UNIT – II [10 HRS]

Performance of feed back systems – Response of first and second order systems – Steady state error . Error Coefficient and Generalized error Series. Principles of PI, PD and PID controllers.

UNIT – III [10 HRS]

Techniques of determining control system stability. Routh Hurwitz stability criterion, Nyquist stability criterion, Construction of root locus diagram, Root contours – relative stability.

UNIT – IV [10 HRS]

Frequency Response Analysis, Frequency Domain Specifications, Polar Plots, Bode's Plot, Magnitude – Phase plot, Constant M and N Circles.Nichol's Chart. Nyquist Stability Criterion – Relative Stability., Gain Margin, Phase Margin.

UNIT – V [10 HRS]

Principle of digital control systems, Lag, Lead and Lag – Lead Compensation, Compensators using MATLAB, Introduction to state space analysis.

TEXT BOOKS:

1. Benjamin. C.Kuo. – Automatic Control systems , Prentice hall of India,III Edition

REFERENCE BOOKS:

1. Ogata .k. – Modern Control Engineering, Prentice Hall of India, 1982.

2.Modern Control system theory and design, - S.M. Shinners, John Wiley and sons INC, 1992.

3.Nagrath and Gopal. – Control systems Engineering, Wiley and sons II Edition, 1998.

Department of Electronics and Communication

Course**: BE (PART –TIME)** Branch: **ECE** Semester: **V**

Sub. Code: **EBPL4BP081** **Credit:3**

(For students admitted from 2008-09 onwards)

Subject: MICROPROCESSOR & SIGNAL PROCESSING LAB

8085 programs

1. Programs using data transfer, arithmetic & logic instructions
2. Programs involving subroutine, Delay & Table processing algorithms.
3. Sorting and Searching algorithms.
4. Interfacing PPI (Square wave generation, 7 segment display, etc)
5. Interfacing ADC/DAC
6. Stepper Motor Interface
7. Traffic Light Control.

8086 Programs

8. Arithmetic Operations / Data Transfer Operations.
9. String Operations.

Programs using ADSP 2181 Processor

10. Arithmetic Operations.
11. Circular Addressing.
12. Waveform Generation.

Department of Electronics and Communication

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **V**

Sub. Code: **EBPL5BT081** **Credit: 4**

(For students admitted from 2008-09 onwards)

Subject: DIGITAL COMMUNICATION

Pre - requisite: Signals and Systems, Digital Electronics.
Objectives: To Design digital communication links for terrestrial, line, and satellite, computer systems.

UNIT – I [10 HRS]

Base-band transmission : Lowpass sampling theorem ,Aliasing , Natural sampling and flat-toped sampling, Quantization error, PCM, Companding, PCM Multiplexing, Thermal noise, SNR in PCM, Threshold effect, DPCM, Predictor, DM, Quantization noise, Slope overload in DM, SNR in DM, Comparison of PCM and DM, ADM.,

UNIT – II [10 HRS]

Base-band Data Transmission : Baseband binary PAM system, Baseband shaping.Matched filter:Optimum transmitting and receiving filters for noise immunity.Principle of correlative coding – duobinary, modified duobinary and generalized forms. Baseband M-ary PAM, Eye pattern.

UNIT –III [10 HRS]

Bandpass Data Transmission : Model of bandpass data transmission system.. ASK, PSK, FSK Signals – detection techniques, receiver implementation and probability of error. DPSK and QPSK.

UNIT –IV [10 HRS]

Spread spectrum: Spreading techniques – PN sequences – DS – SS, use of spread spectrum with CDMA,Frequency hopping spread spectrum. Acquision and Tracking of FH, DS Signals.

UNIT – V [10 HRS]

Error Correcting Codes: Introduction –coding for error detection and correction –Block codes – Hamming distance – coding and decoding – Examples of Algebraic codes (Hamming code, single parity check codes, Golay's cyclic codes, BCH codes. Burst error correction.Convolution coding – decoding.

TEXT BOOK:

1. Simon Haykins: Digital Communications, John Wiley, 1994.

REFERENCE BOOKS:

1. Taub and Schilling : Principles of Communicaton Systems (2/e). McGraw Hill.
2. S.Shanmugam : Digital and Analog Communications. John Wiley.
3. B.Carlson : Introduction to Communiction systems (3/e). McGraw Hill.
4. J.G.Prokis : Digital communicat*on (2/e). McGraw hill.*
5. B.P.Lathi : Modern Digital and Analog Communication systems. Holt saunderrs international, 1983

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE** Semester: **V**

Sub. Code: **EBPL5BT082** **Credit: 4**

(For students admitted from 2008-09 onwards)

Subject: MICROCONTROLLER

Pre - requisite: Knowledge of Microprocessors.
Objectives: To build Controllers for wireless applications.

UNIT – I [10 HRS]

Micro controller overview: Micro controller & embedded processors, Architecture of 8051, Addressing modes.

UNIT – II [10 HRS]

8051 Assembly language programming: Introduction: Program counter, PSW, register banks, arithmetic, logic, Jump-loop instruction, single – bit instructions. Programming timer/counter.

UNIT – III [10 HRS]

Interrupt & serial communication: 8051 interrupt & programming timer interrupt, 8051 connection to RS 232.Serial communication programming & programming serial communication interrupt.

UNIT – IV [10 HRS]

Interfacing 8051 with real world: ADC interfacing, stepper motor, DAC interfacing, ROM interfacing, 8255 interfacing

UNIT – V [10 HRS]

Intel 8096 micro controller: Overview, Configuring 8096, General Purpose I/O ports, Resets & Self Protection Options, Interrupts, A/D Converter, Serial Port.

TEXT BOOK:

1. Muhammad Ali Mazidi and Janice Gillipse Mazidi , "The 8051 Micro controller and embedded systems"
   Pearson Education (Singapore) Pvt.Ltd., VI Reprint.
2. John.B.Peatman, "Design with Microcontrollers' Mc Graw Hill Pub.

REFERENCE BOOK:

1. Kennath J Ayala, " The 8051 Micro Controller Architecture, Programming and Application" II Edn.
2. Intel Data Book. (80C 196 KB) Unit V.

Department of Electronics & Communication Engineering

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **V**

Subject code: **EBPL5BT083** Credit: 4

(For students admitted from 2008-09 onwards)

Subject: ANTENNA AND PROPAGATION

Pre - requisite: Electromagnetic theory and Wave guides, Calculus.
Objectives: To know the principle of radiation & design of Antennas for medium waves, Short waves, and Microwaves.

UNIT – I [10 HRS]

Radiation: Retarded potentials, Radiation from an alternating current element, Monopoles and dipoles, Effective length, Radiation resistance; Directional properties of dipole antennas, Gain and directivity, Field patterns, Antenna terminal impedance, Travelling - wave antennas and effect of point of speed on standing wave antennas.

UNIT – II [10 HRS]

Antenna Arrays: Arrays of two point sources, Linear arrays of point sources, Beamwidth, Broad - side and end fire arrays, Binominal arrays, Pattern multiplication, effect of earth on radiation patterns of antennas, Effective area, Practical antennas and methods of excitation.

UNIT – III [10 HRS]

Special Purpose Antennas: (Qualitative treatment only) Loop antennas, Folded dipoles, Travelling wave antennas. V and rhombic antennas. Slot radiators, Horn antennas, Reflector antennas, Parasitic elements and Yagi arrays, Wideband antennas, Log periodic antennas.
Antenna applications: Antenna for low, medium and high frequencies

UNIT – IV [10 HRS]

Propagation: Factors involved in the propagation of radio waves. The ground wave, Reflection of radio waves by the surface of the earth, Space wave propagation, Consideration in spaced wave propagation, Atmospheric effect in space wave propagation, Ionosphere and its effect on radio waves, Mechanism of Ionospheric propagation, Refraction and reflection of sky wave by the ionosphere, Ray paths, skip distance, Maximum usable frequency, Fading of signals, Selective fading , Diversity reception.

UNIT – V [10 HRS]

Measurements: Impedance, Field pattern and gain of antennas, Radiation pattern, Ionospheric measurements - Vertical incidence measurements of the ionosphere, Relation between oblique and vertical incidence transmission.

TEXT BOOK:

1. Edward C. Jordan: *Electromagnetic waves and Radiating Systems*, Asia Publishing House, PHI, 1978.

REFERENCE BOOKS:

1. F.E. Terman: *Electronic and Radio Engineering*, McGraw Hill, 1984.
2. Robert E. Collin: *Antennas and Radio Wave propagation*, McGraw Hill, 1985.
3. Antenna and Wave Propagation by K.D. Prasad, Satya Prakasam, New Delhi
4. Rajeswari Chatterjee: *Antenna Theory and Practice*, Wiley Eastern Ltd. 1988.

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE** Semester: **V**
Sub. Code: **EBPL5BT084** **Credit - 4**
(For students admitted from 2008-09 onwards)

Sub : BROADCASTING & TELECASTING SYSTEMS

UNIT- I (10 HRS)

Basics of television system: Sound and picture Transmission- Block Diagram. Theory of Scanning. Resolution and Gradation.
The Composite Video Signal: Video Channel Bandwidth, Channel Bandwidth using VSB Transmission and its Demerits. Channel Bandwidth for Color Transmission.
Camera tubes: vidicon, Plumbicon,Silicon Diode Array Vidicon, Solid-state Image Scanners (The CCD).

UNIT –II (10 HRS)

Monochrome Television Receiver: Television Signal Transmission, and Interference. TV Antennas for Transmission and Reception(Overview). VHF Tuners, Video IF Sub System, Intercarrier Sound System, Video Detector, Video Amplifier, Synch Separator, AFC, Vertical Deflection Circuit & Horizontal Deflection Circuit, Monochrome Picture Tube.

UNIT – III (10 HRS)

Color Television System:
Colorimetry: Principles of additive and subtractive Color Mixing, Color Characteristics, Chromocity Diagram
Color Television Camera: Generation of RGB signals, Color Television Picture Tubes, Delta gun, PIL Tube, Trinitron, Color Signal Transmission, Bandwidth of Color Signal Transmission, Sub-Carrier Modulation, Color Burst Signal, The Chrominance Signal, NTSC and PAL encoding Signals.

UNIT – IV (10 HRS)

Block Diagram of PAL – D Receiver, Luminance Channel, Chrominance amplifier Color Burst Separation, & Burst Phase Discriminator. Sub-Carrier DSC. AGC Circuits. Ident and Color Killer Circuits. U&V Demodulators, R,G,B Matrix & Drivers.

UNIT –V (10 HRS)

Special Topics IN TV:
Digital Tuning Circuits, Remote Control, Introduction to Cable satellite Television. Video Cassette Recorders, Videodisc systems. Fundamentals of Digital TV & HDTV.

Text Book:

1. Gulati. R .R – "Modern Television Practice, Principle of Tech & servicing", New Age International Pvt.Ltd., 2002

Reference Books:

1. Television & Video Engineering – Arvind. M. Dhake TMH 2/e 2002.
2. Basic Television & Video System – Grob & Herdon, Mc Graw Hill.

Department of Electronics and Communication

Course**: BE (PART –TIME)** Branch: **ECE** Semester: **V**

Sub. Code**: EBPL5BP081** **Credit:3**

(For students admitted from 2008-09 onwards)

Subject: COMMUNICATION LAB

1. Study of sampling theorem and time division multiplexing and demultiplexing
2. Pulse width modulation and demodulation, pulse amplitude modulation and demodulation
3. Pulse code modulation and demodulation, Pulse position modulation and demodulation
4. Study of amplitude shift keying system
5. Study of frequency shift keying system
6. Addition, subtraction, multiplication, division using DSP
7. FIR filter / IIR filters using DSP
8. AM Modulation and Demodulation
9. FM Modulation and Demodulation
10. Pre emphasis and De emphasis
11. Radiation pattern of half wave – dipole antenna
12. Characteristics of AM receiver (Selectivity and sensitivity)

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE** Semester: **VI**

Sub. Code: **EBPL6BT081** **Credit: 4**

(For students admitted from 2008-09 onwards)

Subject: MICROWAVE ENGINEERING

UNIT – I [10 HRS]

Microwave Network Analysis:

Impedance and Admittance Matrices, Scattering Matrix, Transmission (ABCD)Matrix, Impedance description of Two Port Junction, Scattering Matrix Formulation for N port junction.

UNIT – II [10 HRS]

Passive Devices

Terminations, Attenuators, Phase Changers, Directional Couplers, E – Plane & H – Plane Tee, MagicTee, HybridRing, Microwave Propagation in Ferrites, Ferrite Devices, Isolators, Circulators.

UNIT – III [10 HRS]

Microwave Tubes:

Limitation of Conventional Tubes at Microwave Frequency.

Klystron – Reentrant Cavities, Velocity Modulation, Bunching Process,Output Power & Beam loading,

Reflex Klystron – Velocity Modulation, Power Output & Efficiency, Equivalent Circuit.

TWT : Slow Wave Structure, Amplification Process.

Magnetron: Types, Cylindrical Magnetron, Hull Cut off Voltage, Angular Frequency, Power Output and Efficiency, Performance Chart and Reike Diagram, Pushing and Pulling.

UNIT – IV [10 HRS]

Microwave Solid State Devices:

Introduction, Bipolar Transistors – Structure, Principles of Operation, Amplification Phenomenon, Power and Frequency Limitations. Tunnel Diode – Principle of Operation, Microwave Characteristics.

TED : Gunn Effect Diode, Gunn Effect, RWH Theory, Two Valley Model Theory, Modes of Operation, Gunn Oscillation Modes, LSA Mode, IMPATT & TRAPATT Diode.

UNIT – V [10 HRS]

Parametric Devices:

Description, Manley – Rowe Power Relations, Parametric Amplifier, Up Converter, Down Converter.

Micro Strip Lines : Characteristic Impedance, Losses in Micro strip Lines, Parallel Strip Lines, Coplanar Strip Lines.

Microwave Measurements: Impedance, VSWR, Klystron Characteristics.

Text Books:

1. SY Liao – Microwave Devices and Circuits,PHI , III Edn, 2000

Reference Books:

1. RE Collin - Foundation for Microwave Engineering. Mc Graw Hill
2. Microwave Engineering – Annapurna Das
3. Soohoo – Microwave Electronics – Addison – Wesley.

Department of Electronics & Communication Engineering

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **VI**

Subject code: **EBPL6BT082** Credit: 4

(For students admitted from 2008-09 onwards)

Subject: OPTICAL COMMUNICATION

UNIT – I [10 HRS]

Block diagram of Optical communication system. Basic optical laws and definitions. Fiber types. Rays and modes-Skew rays, meridian rays. Step index fiber structure. An overview of fiber materials. Fiber fabrication methods.

UNIT – II [10 HRS]

Signal degradation in optical fiber: - Attenuation. Unit of attenuation. Absorption. Scattering losses. Bending losses. Core and Cladding loss. Signal distortion in optical wave-guides: - Group delay. Material distortion. Wave guide distortion. Intermodal distortion.

UNIT – III [10 HRS]

Optical Sources: LED: LED Structures. Internal Quantum efficiency. LED Power. Modulation of LED. Laser Diode: Lasing action. Types. Structures and Radiation Patterns. Temperature effect. Modal noise. Partition noise. Reflection noise

UNIT – IV [10 HRS]

Optical receivers: Physical principles of photo diodes. Photo detector noise. Temperature effect on Avalanche gain.

Wavelength division Multiplexing. Fiber splicing. Optical fiber connector types. Application of optical fibers in Local Area Networks.

UNIT – V [10 HRS]

Unguided optical communication: - Introduction. Receiver power calculation. Sources and Detectors- Neodymium laser source, Carbon dioxide laser source, laser arrays. Examples of Unguided Optical communication system- Terrestrial system, A proposed optical communication system for near-space.

TEXT BOOKS:

1.Optical Fiber Communications – Gerd Keiser, Third Edition –Mc Graw Hill Internation, III Edn, 2000

REFERENCE BOOKS:

1. J Senior, "Optical Communication, Principles and Practice", PHI, 1994
2. Optical Communication System- John Gowar , Second Edition - PHI., 2001

Department of Electronics & Communication Engineering

Course: **BE (PART - TIME)** Branch: **ECE** Semester: **VI**
Subject code: **EBPL6BT083** Credit: 4

(For students admitted from 2008-09 onwards)

Subject: TELECOMMUNICATION SWITCHING SYSTEMS

UNIT – 1[10 HRS]

Evaluation of Public Telephone Systems, Classification of switching Systems, Basic Telecommunication Equipments – Telephone Hand set, Pulse Dialing , Tone Dialing. Switching – Strowger, Cross bar Systems. Telephone Connections – Simplex, Duplex, Half Duplex, Echo, Echo Suppressor, Attenuation (Chapter 1,2,3 of Text -1).

UNIT – 2[10 HRS]

Band width of Telephone Channel, Transmission Media – Open wire, UG cable, Co-axial Cable, Microwave, Satellite Electronic Switching: Multiplexing – FDM, TDM, WDM, SONET Multiplexing. Circuit switches – Space Division Switches, Time Division Switches, Time – Space – Time Switches. Telephone Networks – Digital Cross Connect, Stored Program Control Switches (Chapter 4 of Text 2)

UNIT – 3[10 HRS]

Traffic Engineering: Network Traffic Load & Parameters, Grade of Service, Blocking Probability. Modeling Switching Systems: Markov Process, Blocking Models & Delay Systems. (Chapter 8 of Text 1)

UNIT – 4[10 HRS]

ISDN: Introduction, Services, X-400 Family of Standards, Network & Protocol Architecture, Transmission Channels. (Chapter 8 of text 1)

UNIT – 5[10 HRS]

Data Transmission: Basics – Serial & Parallel Transmission, Asynchronous Transmission – Bit, Character, Frame Synchronization. Synchronous Transmission – Bit Synchronization – Clock Encoding and Extraction Methods, RZ, NRZ, Differential Manchester. DPLL – NRZI, AMI, HDD3 Codes. Character Oriented Synchronization, Bit oriented synchronization, Error Detection Methods, Parity Block Sum Check, CRC. (Chapter 3 of Text 3).

Text Book:

1. Telecommunication Switching Systems & Networks by Thiagarajan Viswanathan. PHI
2. Communication Networks by Alberto Leon Garcia, Indra Widjaja TMH.
3. Data Communications, Computer Networks & Open Systems by Fred Halsal Pearson Education Asia.

Reference Books:

1. Telecommunication System Engineering Gordon Whiete, Butter Worth Heinemann
2. Telecommunication and Computer – James Martin, PHI

Department of Electronics and Communication

Course**: BE (PART –TIME)** Branch: **ECE** Semester: **VI**

Sub. Code: **EBPL6BP081** **Credit:3**

(For students admitted from 2008-09 onwards)

Subject: MICROWAVE AND OPTICS LAB

1. Frequency, Wavelength measurement.
2. Reflex klystron - mode characteristics.
3. Gunn diode characteristics.
4. VSWR (Low and High) measurements.
5. Impedance measurements.
6. Antenna measurements - directivity and gain.
7. Directional coupler-directivity and coupling coefficient
8. Magic -T.
9. Circulator/Isolator Characteristics.
10. Determination of Numerical aperture and Fiber Losses.
11. LED / Photodiode (PD) characteristics.
12. Study of single mode/multimode fibers.

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE** Semester: **VII**
Sub. Code: **EBPL7BT081** **Credit: 4**
(For students admitted from 2008-09 onwards)

Subject: VLSI DESIGN

Pre - requisite: Electronic devices and circuits, Digital Electronics**.**
Objectives: To understand the principles of CMOS-VLSI technology, and the design issues involved at circuit, logic, layout, system level and to learn programmable logics.

UNIT – I [10 HRS]

Introduction to VLSI and MOS Transistor theory: Evolution of IC Technologies: SSI, MSI, LSI, VLSI, ULSI, and GLSI. The Moore's Law.
MOS THEORY: The MOS as switch – nMOS and pMOS. CMOS logic and its features. The nMOS enhancement Transistor – Working and Characteristics. Threshold voltage and Body effect of MOS. MOS device design equations (First order effects).
MOS INVERTERS: The CMOS inverter Transfer characteristics, Noise margin. The nMOS and pseudo-nMOS inverter. The BiCMOS Inverter. The CMOS Transmission gate. (Chapter's 1 & 2, Book 1)

UNIT – II [10 HRS]

CMOS processing technology and Layouts: Silicon Semiconductor fabrication technology: Fabrication of nMOS and CMOS (Basic n-WELL process). (Chapter 3, Book 1)
Layouts and Design rules: λ based rules, Simple CMOS Stick Layout diagrams - Inverter, NAND/NOR gates and Multiplexer. (Chapter's 3 & 5, Book 1)
Scaling: Constant Field, and Constant voltage. (Chapter 3, Book 1)

UNIT – III [10 HRS]

MOS Circuit performance and CMOS Logic circuits: Sheet Resistance definition, MOS device capacitances – model. Distributed RC effects. Switching characteristics - Rise time, Fall time, and Delay time. Stage ratio. (Chapter 4, book1)
Simple examples of Combinational and Sequential circuits using CMOS: NAND/ NOR gates, and Compound gates, Latches, and Registers. (Chapter 1&5, book 1)

UNIT- IV [10 HRS]

Sub System Design, and Testing: General System Design–Design of ALU subsystems, Adder and Multipliers
Memories – Static RAM, Control Logic Implementation using PLA's. (Chapter 8, book 1)
Testing of VLSI circuits –Need for Testing, Fault models, and ATPG. Design for Testability (DFT)– Scan Based and Self-test approaches. (Chapter 7, book1)

UNIT – V [10 HRS]

Programmable Logic's: Basic ROM structures, PLAs, PALs, PLDs, Implementation of Traffic Light controller using PLD. (Chapter 3, book2)
FPGAs and CPLDs: XILINX and ALTERA series. (Chapter 6, book 2)

TEXT BOOK:

1. Neil Weste and Kamran Eshraghian "Principles of CMOS VLSI Design "- Addison Wesley, 1998.
2. Charles H Roth, Jr. "Digital Systems Design using VHDL"- Thomson Learning, 2001

REFERENCE BOOKS:

1.VLSI Design Principles- John P. Uyemura, John Wiley,2002
2. E. Fabricious , Introduction to VLSI design, McGraw-Hill 1990
3. Wayne Wolf, Modern VLSI Design, Pearson Education 2003

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE**
Sub. Code**: EBPL6BE084A** **Credit - 4**

(For students admitted from 2008-09 onwards)

Sub: ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS [Elective]

Pre - requisite: Mathematics and basics of Fuzzy logic.
Objectives: Design of AI systems and resolution techniques (research).

UNIT I [10HRS]

Introduction to AI and Basic Problem solving methods : Meaning of AI – AI problems – AI techniques – criteria for success. Production systems – State space search – control strategies – Heuristic Approach – Forward and Backward reasoning – Hill climbing techniques – Breadth first search – depth first search – best search – staged search.

UNIT II [10HRS]

Knowledge Representation: Predicate logic – resolution – question answering – non monotonic reasoning – statistical and probablistic reasoning – fuzzy logic.

UNIT III [10HRS]

Game Playing: Minimax search – adding alpha beta cutoff – futility cutoff
Natural language processing : Syntax and semantic analysis – semantic grammar – core grammar – augmented transition network – discourse and pragmatic processing.

UNIT IV [10HRS]

Machine Learning : Role learning – learning by advice – learning by problem solving and examples – discovery as learning – AM learning and analogy.

UNIT V [10HRS]

Expert Systems : Introduction – rule based system architecture – Non production system architecture – knowledge system building tools.

TEXT BOOKS:

1. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill, II Edition, 1991.
2. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert systems", Prentice Hall of India, Third edition, 1990.

REFERENCE BOOKS:

1. P.H. Winstron, "Artificial Intelligence", Addison Wesley, 1983.
2. Yoshikai Shirai and Junichi Tsujii, "Artificial Intelligence – Concepts, techniques and applications", John Wiley and Sons, 1986.
3. M.W. Richaugh, "Artificial Intelligence – A knowledge based application", PWS Rent publishing, Boston, 1986.

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE**
Sub. Code**: EBPL6BE084B** **Credit - 4**
(For students admitted from 2008-09 onwards)

Sub: BIO-MEDICAL SIGNAL PROCESSING [Elective]

Pre - requisite: Basic Biology, Circuit theory.
Objectives: To study the various Bio-Medical Instruments and their spectrums for the recognition and cure of biological disorders (research).

UNIT I [10Hrs]

Basic Physiology: Bio electrodes; Transducers:

Cells and their structures Resting and action potential- nerve system - blood circulation system- cardio system
bio- electrodes – transducers and its application to bio medical instrumentation.

UNIT II [10Hrs]

Imaging system: Recording & Analyzing Bio signals:

Imaging system:

X-Ray imaging – image intensifiers- CT Scan systems; MRI,

Recording & Analyzing Bio signals:

ECG, EEG, EMG, their lead systems and signal / Nature characteristics.

UNIT III [10Hrs]

Signal conversion & processing: Sampling theorem-Simple signal conversion system & its circuits- Basics of digital filtering-IIR & FIR filters and its applications - Band pass filtering techniques- - Differentiation techniques- Template matching techniques – QRS detection algorithm.

UNIT IV [10Hrs]

Data reduction techniques: Turning point algorithm – A2 TEC algorithm –FAN algorithm – Discrete cosine transform for ECG compression.

UNIT V [10Hrs]

Bio-telemetry: Introduction to biotelemetry - components of bio-telemetry systems – Channels used in Bio- telemetry - .- applications of telemetry in patient care – applications of computer in bio-medical instrumentation.

TEXT BOOK:

1.Willes J Tompokins,"Biomedical Digtal signal procesing", Prentice hall,1993

2. M.Arumugam "Bio-medical Instrumentation" Anuradha agencies publishers, 1992

REFERNCE BOOKS:

1. Lesis Cromwell, Fred. j. Werbell and Erich.A. Ofraffer "Bio-medical Instrumentationand measurements" PHI, 1990.
2. Khandpur, "Handbook on bio-medical instrumentation", TMH Ltd, 1989.

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE**
Sub. Code: **EBPL6BE084C** **Credit - 4**
(For students admitted from 2008-09 onwards)

Subject: CODING THEORY AND CRYPTOGRAPHY [Elective]

Pre - requisite: Engineering Mathematics, Digital Electronics.
Objectives: Information Security and error free communication (research).

UNIT – I [10 HRS]

Introduction to Basic algebra and fundamentals of Galois fields: Binary field and Hexadecimal field groups, rings, fields, matrix representation of vector spaces, linear algebra, integer ring, finite fields based on the integer ring, polynomial rings, finite fields based on polynomial rings, primitive elements, the structure of finite fields.

UNIT – II [10 HRS]

Linear block codes: Hamming distance – Code geometry and error correction capability – parity check code – error detection decoding (using matrix method) – product codes – single error correction – binary repetition codes – Hamming code (7,4), Encoder – Decoder, Properties of syndrome.

UNIT – III [10 HRS]

Cyclic Codes: Polynomial description of cyclic codes, Minimal polynomials & conjugates – Matrix description of cyclic codes – Hamming code as cyclic codes – Cyclic codes for correcting double error, shift register – Encoder/Decoder for cyclic codes.

UNIT – IV [10 HRS]

Convolutional Codes: Systematic rate ½ codes and tree diagram – trellis and state diagram, Rate b/v codes, minimum distance, decoding distance and minimum free distance. Feedback decoding – syndrome feedback decoding of systematic codes – Feedback decoder that uses a majority logic circuit and threshold decoding. Viterbi decoding algorithm – Hard decision decoding, coding gain – Comparison of coded and uncoded systems.

UNIT – V [10 HRS]

Encryption and Decryption: A Model of the Encryption and Decryption process, The Secrecy of a Cipher system, Practical Security, Stream Encryption, Public key cryptosystems.

TEXT BOOK:

1. Bernard Sklar – Digital Communications Fundamentals and Applications, II Edition, Pearson Education Asia, 2001

REFERENCES:

1. Arnold M. Michelson, Dr. Allen H. Levesque – Error control techniques for digital communication – John Wiley & Sons.
2. Dr. Richard E. Blahut – Theory and practice of error control codes – Addison Wesley publishing company, 1983.

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE**

Sub. Code: **EBPL6BE084D** **Credit - 4**

(For students admitted from 2008-09 onwards)

Subject: COMPUTER AIDED SYSTEM DESIGN [Elective]

Pre - requisite: Circuit Theory, Electronic Devices and circuits, Digital Electronics.

Objectives: To learn Computer automation techniques for designing electronic circuits at Circuit and gate level.

UNIT – I [10HRS]

Overview of EDA and PSPICE: Evolution of EDA Tools, Typical Design Flow of VLSI IC circuits (ASIC Flow), Design Capture and Design Verification Tools. (Chapter 1, book 3)

ANALOG CIRCUIT TECHNIQUES: Overview of PSPICE, Types of Simulation - DC, AC, Transient, Monte Carlo, Parametric and others, Simulation devices- Laplace Devices, Energy sources, Passive components, Semi conductors, ICs Special devices – voltage markers, Initial conditions, etc. (Book1)

UNIT – II [10HRS]

Modeling for Simulation in PSPICE: Modeling of digital circuits in SPICE, Analog modeling in the frequency domain, Time domain, Models for RLC, Diode, BJT, JFET and MOSFET. (Book 1)

UNIT – III [10HRS]

VHDL: Introduction to VHDL – Entities and Architectures, Behavioral Modeling – Concurrent & Sequential processing – if, case, loops, next, exit, wait, and assert statements. Structural modeling –Port Map, Components and Generics. Delay models –Inertial, Transport and Delta Delays.

Datatypes- Variables, Signals, Constants, Arrays. VHDL Operators, Functions, Procedures, Packages, Libraries and Configurations. Simple programming examples of Combinational and Sequential circuits. (Book 2)

UNIT – IV [10HRS]

Verilog HDL: Introduction to Verilog - Modules and Module Instances, Design Blocks and Stimulus Blocks. Datatypes, and Operators. Modeling - Gate-Level (Structural), and Dataflow modeling- continuous assignments. Behavioral Modeling- initial, always, Blocking and Non-Blocking statements. Basic System Tasks -display, monitor, time and stop. Tasks and Functions. Simple Programming Examples of Combinational and Sequential Circuits. (Book3)

UNIT – V [10HRS]

Advanced Topics in Verilog and Synthesis: Delay Modeling-Distributed, Lumped, and Pin-to-Pin, Rise/Fall/Turn-Off, Min/Typical/Max Delays. Basic Switch-level modeling – PMOS, NMOS, and CMOS. Simple programming examples of Switch -level modeling- CMOS Inverter, NAND/NOR gates, Multiplexers, CMOS Latches.

Introduction to Verilog Synthesis Flow: Definition of terms – Technology Mapping, Library Cells. and Technology Libraries. (Book3)

TEXT BOOK:

1. Introduction to Pspice using Orcad for circuits & Electronics, Muhammad Rashid, Third Edition, Pearson Education
2. Douglas L. Perry, "VHDL –Programming by Example", TMH, 2002
3. Samir Palnitkar, "Verilog HDL –A guide to Digital Design and Synthesis" Pearson Education, 2004

REFERENCE BOOKS:

1. Neil Weste and Kamran Eshraghian "Principles of CMOS VLSI Design "- Addison Wesley, 1998.
2. Charles H Roth, Jr. "Digital Systems Design using VHDL"- Thomson Learning, 2001

Department of Electronics and Communication

Course**: BE (PART - TIME)** Branch: **ECE**

Sub. Code: EBPL6BE084E **Credit :4**

(For students admitted from 2008-09 onwards)

Subject: COMPUTER ARCHITECTURE [Elective]

Pre - requisite: Basics of computers, microprocessors.

Objectives: Computers - Different types, their working and debugging. Study of 8086 and advanced processors (research).

UNIT – I [10HRS]

Evolution of Computers – Generations of Computer Systems – Different types of Computers – Characteristics of Von Neumann architecture – Limitations of computer systems – Parallel computer structures.

UNIT – II [10HRS]

Principles of Linear pipelining – Classifications of pipeline processors – Interleaved memory organizations – Instruction and arithmetic pipelines – Design examples – Vector processing requirements – Characteristics of vector processing.

UNIT – III [10HRS]

Advanced computer architecture – RISC machines – Design principles – RISC versus CISC – example RISO architecture SPARC – Static and dynamic data flow computer architecture – Data flow design – Fault tolerant computers.

UNIT – IV [10HRS]

Internal Architecture of 8086 microprocessor – Memory organization – Input and Output structure – Memory organization – Minimum and Maximum mode – Memory segmentation – Bus structure and timing – Programmable hardware registers – Addressing Modes – Levels of programming – 80386, 80486 and Pentium architectures, Program segments and structure – Programming with macros – I/O structure and programming – Program development tools and processes – ASCII and integer conversion – Stacks procedure – Interrupts and interrupt service routines – Macros.

UNIT – V [10 HRS]

Introduction – Assembler instruction format – Data transfer instructions – Arithmetic and Logical instructions – Shift and rotate instructions – Branch instructions – Processor control instructions – String operation instructions – Assembler directives.

TEXT BOOKS:

1. Microprocessor X86 Programming by K.R. Venugopal, Rajkumar, BPB Publications.
2. Microcomputer Systems, The 8086/8088 family : Architecture, Programming and Design by Liu.Y and Gibson G.A. – Prentice Hall of India Pvt. Ltd.

REFERNCE BOOKS:

1. "Structured Computer Organization", Andrew S. Tanenbaum, Prentice Hall of India Pvt.Ltd., 1990.
2. "Computer Architecture and Parallel processing", Kai Hwang and A. Briggs, McGraw Hill Information edition, 1985.
3. Programming the 80286, 80386, 80486 and Pentium based personal computer by Barry B. Brey – Prentice Hall of India Ltd.

Department of Electronics and Communication

Course**: BE (PART - TIME)** Branch: **ECE**

Sub. Code: EBPL7BE082A **Credit :4**

(For students admitted from 2008-09 onwards)

Subject: DATA COMMUNICATION NETWORKS [Elective]

UNIT - I (10 Hrs)

Network and Layered Architecture:

Data Communication Networks : Introduction to PSTN, LAN, ISDN, MAN(Ch1- Text 1)

Protocols, Services & Layered Architecture : HTTP, DNS, SMTP, TCP & UDP Transport Layer Services, OSI Reference Model. Layered Services : Pear to Pear Communication, Connection Oriented and Connectionless Services, Blocking and Unblocking, Multiplexing and De multiplexing, Overview of TCP/IP Architecture. (Ch 2 of Text 2).

UNIT - II (10 HRS)

Data Link Layers:

Peer to Peer Protocols – Service Models, ARQ Protocols & Reliable Data Transfer Service – Stop and Wait ARQ Protocol, Go Back N ARQ Protocol, Selective Repeat ARQ Protocol.

Framing – Flag, Bit Stuffing, Byte Stuffing.

Point to Point Protocol: HDLC Data Link Control. (Ch 5 of Text 2.)

UNIT – III (10 HRS)

Medium Access Control Protocol:

Multiple Access Communications : Random Access – ALOHA, Slotted ALOHA, CSMA, CSMA – CD, Scheduling MAC – Reservation System, Polling, Token Passing Rings.

Channelisation : FDMA, TDMA, CDMA.

LAN Protocol – LAN Structure, 803.3 LAN Standard.

Token Ring : 802.5 LAN Standard.

Wireless LAN : 802.11 LAN Standard. (Ch 6 of Text 2)

UNIT – IV (10HRS)

Packet Switching Network:

Packet Switching Network Topology. Datagrams, Virtual Circuits. Connectionless Packet Switching, Virtual Circuit Packet Switching, VCI.

Routing – Classification, Routing Tables – Hierarchical Routing, Specialised Routing, Shortest Path Routing. ATM Network. (Ch 7 of Text 2)

UNIT – V (10 HRS)

Traffic Management :

FIFO and Priority Queues, HOL Priority Queueing, Fair Queueing.

Congestion Control: Open Loop Control – Admission Control, Policing, Traffic Shaping, Closed Loop Control – End to End vs Hop by Hop, Implicit Vs Explicit Feedback.

Delay and Loss Performance - Delay Analysis and Little's Formula, Basic Queueing Models – Arrival Process, Service Times, Queueing System Classification, M/M/1 Basic Multiplexor Model. M/G/1 Model. (Ch 7 of Text 2)

Text Book :

1. Data Communication, Computer Networks and Open Systems By Fred Halsal IV Edition, Pearson Education Asia.
2. Communication Networks By Alberto Leon Garcia, Indra Widjaja, II edn, TMGH

Reference Books:

1. Data and Computer Communication By William Stalling VI Edition Pearson Education Asia.
2. Computer Network By Andrew Tanenbaum III Edn PHI .

Department of Electronics and Communication

Course**: BE (PART - TIME)** Branch: **ECE**

Sub. Code: **EBPL7BE082B** Credit - 4

(For students admitted from 2008-09 onwards)

Subject: DIGITAL IMAGE PROCESSING [Elective]

Pre - requisite: Matrix Algebra.

Objectives: IMAGE - Acquisition, Enhancement, Restoration, Compression (research).

UNIT I [10HRS]

Digital image fundamentals: Elements of digital image processing systems- structure of human eye- image formation- contrast sensitivity- sampling quantization- neighbours of pixel- distance measures-photographic film structure and exposure – film characteristics

Image transform: Introduction to fourier transform- DFT properties of 2-D FFT, seperability, Translation, periodicity,rotation,average value-FFT algorithm-walsh transform – Hadamard transform –DCT.

UNIT II[10HRS]

IMAGE ENHANCEMENT: Definition- Spatial domain methods-Frequency domain methods-Histogram modification technique- neighbourhood averaging- median filtering – lowpass filtering-average of multiple images- image sharpening by differentiation and high pass filtering.

UNIT III [10HRS]

IMAGE RESTORATION: Definition and degradation model- Discrete formulation- circulant matrices- Block circulant matrices,effect of diagonalization of circulant and block circulant matrices- - unconstrained and constrained restoration- inverse filtering - Wiener filtering-restoration in spatial domain.

UNIT IV [10HRS]

IMAGE ENCODING: Objective and subjective fidelity criteria- Basic encoding process- c – mapping-quantizer- coder- differential encoding- contour encoding

-Run length encoding - Image encoding relative to a fidelity criterion, Differential Pulse Code Modulation

UNIT V [10HRS]

Image segmentation: The detection discontinuities; Point detection, Line detection, Edge detection-edge linking and boundary detection: local analysis-Thresholding: Global; thresholding techniques and optimal thresholding- basic formulation of region oriented segmentation

TEXT BOOKS:

1. Rafael C.Gonzalez, Paul Wintz, "Digital Image Processing", Prentice Hall ,1997.

REFERENCE BOOKS:

1. Anil K. Jain, "Fundamentals of Digital Image Processing", Prentice Hall, 1987.
2. A. Rosenfeld, A.C. Kak, "Digital Image Processing", Academic Press, 1979.
3. William K. Pratt, "Digital Image Processing", John Wiley and sons, 1978.

Department of Electronics and Communication

Course**: BE (PART –TIME)** Branch: **ECE**

Sub. Code: EBPL7BE082C **Credit - 4**

(For students admitted from 2008-09 onwards)

Subject: EMBEDDED SYSTEMS [Elective]

OBJECTIVES: To design an embedded systems by understanding its hardware (devices and buses) and software (embedded programming in C and C++, inter-task communication and real time operating systems)

UNIT I [10HRS] INTRODUCTION TO EMBEDDED SYSTEMS

Definition and Classification – Overview of Processors and hardware units in an embedded system – Software embedded into the system – Exemplary Embedded Systems – Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits.

UNIT II [10HRS] DEVICES AND BUSES FOR DEVICES NETWORK

I/O Devices - Types and Examples of device I/O devices – Synchronous - Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in devices ports- Timer and Counting Devices - 'I²C', 'USB', 'CAN' and advanced I/O Serial high speed buses- ISA, PCI, PCI-X, cPCI and advanced buses.

UNIT III [10HRS] PROGRAMMING CONCEPTS :

Programming in assembly language (ALP) vs. High Level Language - C Program Elements: Header and source files, preprocessor directives, Macros and functions, Data types, data structures, modifiers, statements, loops and pointers-Embedded programming in C++ - C program compiler and cross compiler – Optimization of memory needs.

INTER PROCESS COMMUNICATION AND SYNCHRONISATION : Multiple processes in an application – Problem of sharing data by multiple tasks and routines - Inter process communication.

UNIT IV [10HRS] REAL TIME OPERATING SYSTEMS (RTOS)

Operating System Services– I/O Subsystems – Real time and Embedded system operating systems - Need of an ideal RTOS - Interrupt Routines in RTOS environment - RTOS Task scheduling models: Co-operative Round Robin Scheduling, Cyclic Scheduling with Time Slicing – Preemptive Scheduling – Critical Section Service by a Preemptive Scheduler – Fixed (Static) Real time scheduling of tasks - Performance metrics in scheduling models

UNIT V [10HRS] RTOS PROGRAMMING TOOLS

Micro C/OS-II RTOS : System Level Functions – Task Service Functions – Time Delay Functions – Memory Allocation Related Functions – Semaphore Related Functions – Mailbox Related Functions – Queue Related Functions Case Study of coding for an automatic chocolate vending machine using MUCOS RTOS –Case Definition, Multiple Tasks and their functions – Creating a list of tasks, Functions and IPCs – Exemplary Coding (steps only)

TEXTBOOKS :

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint Oct. 2003

REFERENCES :

1. Steve Heath, Embedded Systems Design, Second Edition-2003, Newnes,
2. .David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.
3. Wayne Wolf, Computers as Components; Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001
4. 4.Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware /Software Introduction, John Wiley, 2002.

Department of Electronics and Communication

Course**: BE (PART –TIME)** Branch: **ECE**

Sub. Code: EBPL7BE082D **Credit - 4**

(For students admitted from 2008-09 onwards)

Subject: ENGINEERING ACOUSTICS [Elective]

UNIT I [10HRS] BASIC CONCEPTS AND ACOUSTICS

Plane Waves and spherical Waves, parameters intensity, pressure and velocity, specific Acoustic impedance, Radiation resistance, Strength of Radiators piston impedance functions, HelmoltzsResonator, Basic concept of sonar

UNIT II [10HRS] SPEECH, HEARING AND NOISE

Introduction Voice Mechanism, Acoustic Power output of speech, Mechanism of hearing, threshold of Audibility, Subjective characteristics of Sound – Loudness, Pitch, Timbre, beads, Aural Harmonics and Combination Tones, Masking by pure tones and noise, binaural localization, Sound level Meters, Working Principles.

UNIT III [10HRS] TRANSDUCERS AND AUDIO SYSTEMS:

Introduction, Direct radiator Loudspeaker, Cone Speaker, Loud Speaker Cabinets, Horn Loudspeaker, Measurement of Pressure, Response and Acoustic Power output, Microphones, Principles of Working, Pressure Microphones, Carbon Condenser, Piezo – Electric and Moving Coil Electro Dynamic Microphones. Pressure gradient microphones, Acoustical reciprocity theorem, Magnetic Disc and Tape recording, Mono and Stereo recordings Film recording, Analog and Digital System.

UNIT IV [10HRS] ARCHITECTURAL ACOUSTICS

Introduction, Sabines formula for Reverberation, Measurement of Reverberation time, Classical Ray theory of absorption co-efficient in live and dead rooms. Types of absorbing materials and absorption co-efficient, Sound in enclosures, Calculation of Normal modes and frequencies, transmission loss through walls between enclosures

UNIT V [10HRS] UNDER WATER ACOUSTICS

Introduction Velocity of Around and Sound Transmission Losses in Sea Water, Refraction Phenomena, Influence of Surface reflections on transmission loss and Bottom reflection phenomena, Electro Acoustics Transducers, Magneto Structure and Piezo-electric transducer, Hydro phones, Sonar, Principles of Working.

TEXTBOOKS :

1. L.E. Kinsler and A.R. Frey, 'Fundamentals of Acoustics' Wiley Eastern, 1988

REFERENCES :

1. Olson, 'Acoustical Engineering', Van Nostran, 1957.
2. Leo. L. Bernanack, 'Acoustics', Mc Graw Hill, 1954.,
3. Leon Can, 'Under Water Acoustics', Wiley Interscience, 1970.

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE**
Sub. Code: **EBPL7BE082E** **Credit - 4**
(For students admitted from 2008-09 onwards)

Sub : SPEECH SIGNAL PROCESSING [Elective]

Pre - requisite: Numerical Analysis, Matrix Algebra.
Objectives: Speech recognition, Identification, spectrum estimation (research).

UNIT – I [10HRS]

Nature of Speech Signal: Speech production mechanism, Classification of speech sounds, Nature of speech signal.
Speech Signal Processing : Review of DSP, Digital models for speech signals, significance of short time analysis.

UNIT – II [10HRS]

Time Domain Methods: Time-domain parameters of speech, methods for extracting the parameters, zero crossings, autocorrelation function, pitch estimation.

UNIT – III [10HRS]

Digital representation of Speech Waveform: Sampling speech signals, Review of statistical model for speech, Instantaneous quantization, Adaptive quantization, DPCM with adaptive quantization and with adaptive prediction, PCM to ADPCM conversion.

UNIT – IV [10HRS]

Frequency Domain Methods: Short time Fourier analysis, Filterback analysis, Spectro graphic analysis, Formant extraction, Pitch extraction, Analysis – synthesis system.

UNIT – V [10HRS]

Linear Predictive coding of Speech: Formulation of Linear Prediction problem in time domain, solution of normal equations, interpretation of linear prediction in auto correlation and spectral domains.
Homomorphic Speech Analysis : Cepstral analysis of speech, formant and pitch estimation. Speech recognition, Speech synthesis and speaker verification.

TEXT BOOK:

1. L.R. Rabiner and R.W. Schafer : Digital Processing of Speech Signals (1978), Prentice Hall.

REFERENCE BOOKS:

1. J.L. Flanagan: Speech Analysis Synthesis and Perception (2/e), 1983, Berlin.
2. I.H. Witten: Principles of Computer Speech (1982), Academic Press.

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE**
Sub. Code: **EBPL7BE083A** **Credit -4**
(For students admitted from 2008-09 onwards)

Sub: MOBILE COMMUNICATIONS [Elective]

UNIT – I (10HRS)

Basic cellular system – Performance criteria – Uniqueness of mobile radio environment – operation of cellular system.

UNIT – II (10 HRS)

Elements of Cellular Mobile Radio System Design: General Description- Cell splitting – Specification – cell coverage for signals and traffic – cell site antennas and mobile antennas.

UNIT – III (10 HRS)

Interference : Real time co-channel interference, reduction of CCI – Directional and Omni directional reduction of CCI – Non co-channel interference –Near and Far end interference – Cross talk – Hand off – Frequency management and channel assignment.

UNIT – IV (10 HRS)

Adjusting the parameter of a system : Coverage hole filter – Leaky feeder –Cell splitting – Micro cells – Separation between high way cell sites.

UNIT – V (10 HRS)

Cellular Related Topics: Study of 60 GHz system – Cellular fixed station – Spread Spectrum techniques for mobile communications – Diversity reception techniques for mobile systems.

TEXT BOOKS :

1. William C. Y. Lee, Mobile Cellular Telecommunication systems, McGraw Hill International Edition,1990.

REFERNCE BOOK:

1. William C. Y. Lee, Mobile Communication Engineering, McGraw Hill, 1982.
2. T.S.Rappaport, "Wireless Communications: Principles and Practice, Second Edition, Pearson Education/ Prentice Hall of India, Third Indian Reprint 2003.
3. R. Blake, " Wireless Communication Technology", Thomson Delmar, 2003.

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Course **: BE (PART - TIME)** Branch: **ECE**

Sub. Code: EBPL7BE083B **Credit - 4**

(For students admitted from 2008-09 onwards)

Sub: NEURAL NETWORKS AND FUZZY LOGIC [Elective]

Pre - requisite: Engineering Mathematics.

Objectives: To Identify and Model Physical / Biological systems (research).

UNIT – I [10HRS]

Fundamentals of Artificial neural networks – Biological neuron and their artificial models, Neural processing, learning and Adaptation, Neural Network Learning Rules – Hebbian perceptron delta, Widrow – Hoff correlation, Winner – Take-all, Outstar learning rules.

Single Layer Perceptrons – Multilayer Feed forward Networks – Error back propagation training algorithm, problems with back propagation.

UNIT – II [10HRS]

Applications of Neural Networks: Hopfield networks, Recurrent and bidirectional associative memories, Counter propagation networks, artificial resonance theory (art), Boltzmann machine.

Application of Neural networks – Handwritten digit and character recognition – Travelling salesman problem. Neuro controller, Robot kinematics, Expert systems for Medical diagnosis.

UNIT – III [10 HRS]

Introduction to Fuzzy Logic: Introduction to Fuzzy set theory – Classical set vs Fuzzy set, properties of fuzzy sets, operations on fuzzy sets, union, intersection, complement, T-norm and co T-norm.

Fuzzy relations – Operation on fuzzy relations, cylindrical extensions and projection, Extension principle.

UNIT – IV [10 HRS]

Reasoning and Linguistic Approximations : Theory of approximate reasoning – Linguistic variable, Fuzzy prepositions, Linguistic approximations, Fuzzy if-then statements, Inference rules, compositional rule of inference.

UNIT – V [10HRS]

Applications of Fuzzy Logic: Introduction to fuzzy logic control – structure of FLC, fuzzification, knowledge base, Inference engine, defuzzification, design and tuning of FLC – Choice of Fuzzification and Defuzzification procedure, Application of fuzzy logic control, cement kiln, Traffic regulation, a brief introduction to neuro fuzzy control.

TEXT BOOKS:

1. " Artificial Neural Networks " by B. Yegnanarayana
2. G.J. Klir, T.A. Floger, "Fuzzy sets, Uncertainty and Information", PHI, New Delhi, 1988.

REFERENCES:

1. Vallasu Rao, Hayagriva Rao, C++, Neural Networks and Fuzzy logic, BPB Publications, 1996.
2. S.M. Zuruda, "Introduction to Artificial Neural Systems", Jaico Publishing house, 1992.
3. James Freeman, David Sakpura, "Neural Networks", Addison Wesley, 1999.
4. H. Hellen Doorn, m. Reinfrank, Narosa, "An Introduction to Fuzzy control" , Publishing, New Delhi, 1993.
5. R. K. Yager, D.P. Filev, John Wiley and sons Inc., "Essentials of Fuzzy Modelling and Control", NY 1994.

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Course **: BE (PART - TIME)** Branch: **ECE**

Sub. Code : EBPL7BE083C **Credit - 4**

(For students admitted from 2008-09 onwards)

Subject : PRINCIPLES OF NANO TECHNOLOGY [Elective]

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE**

Sub. Code : EBPL7BE083D **Credit - 4**

(For students admitted from 2008-09 onwards)

Subject : RADAR AND NAVIGATIONAL AIDS [Elective]

Pre - requisite: Communication systems, mathematics.

Objectives: To determine various RADARS - their parameters estimation and representation (research).

UNIT – I [10HRS]

Radar block diagram and operation, radar frequencies, radar range equation,
Prediction of range performance, minimum detectable signal, radar cross section of targets, cross section fluctuations, transmitter power, pulse
Repetition frequency and range ambiguities, system losses and propagation effects.

UNIT – II [10HRS]

CW and FMCW doppler Radar. Doppler effect, CW Radar, basic principles and operation of FMCW radar. MTI and Pulse Doppler radar: MTI block diagram and description, delay line cancellers, range gated doppler filters, Non coherent MTI,Pulse doppler radar. Tracking Radars: Sequential lobing, conical scan and simultaneous lobing mono pulse.

UNIT – III [10HRS]

Synthetic Aperture and Air Surveillance Radar: Synthetic aperture RADAR – Resolution. Radar equation,SAR signal processing, Inverse SAR, Air surveillance radar- User requirements, characteristics and frequency considerations.

ECCM and Bistatic radar: Electronic counter measures. Bistatic radar- description, Bistatic radar equation, comparison of bistatic monostatic radars.

UNIT – IV [10HRS]

Radar signal detection and propagation of waves: Detection criteria,,Automatic detection, CFAR receiver, information available from a Radar, ambiguity diagram, Pulse compression, Propagation over a plane earth, refraction,anamolous propagation and diffraction. Introduction to clutter, surface clutter radar equation.

UNIT – V [10HRS]

Electronic navigation: Adhock direction finder, ADF, VHF Omni directional.
Ranger,Hyperbolic system of navigation-LORAN and DECCA navigation system,TACAN,ILS, GCA as aids to approach and landing.

TEXT BOOKS:

1. M.I.Skolnik: “Introduction to Rdar systems”: Mcgraw hill, IInd edition.
2. N.S.Nagaraja, “Elements of electronic navigation”. Tata McGraw hills 1993.

REFERNCE BOOKS:

1. Peyton Z. Peebles:, "Radar Principles", Johnwiley, 2004
2. J.C Toomay, " Principles of Radar", 2nd Edition –PHI, 2004

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE**
Sub. Code: EBPL7BE083E **Credit - 4**

(For students admitted from 2008-09 onwards)

Subject: ROBOTICS [Elective]

Objectives: Kinematics of Physical motion and automated control systems (research).

UNIT –I [10 HRS]

Introduction: Automation and Robotics – History of Robotics – Robot anatomy – Work volume Robot drive systems – Control systems and dynamic performance – Precision of movement – Robot application.

UNIT – II [10 HRS]

Control Components: Robot activation and feedbacj components – Position sensors – Velocity sensors – Actuators – Power transmission systems – Robot joint control design.

UNIT – III [10 HRS]

Robot Motion Analysis and Control: Manipulatot kinematics – Homogeneous Transformations and Robot Kinematics – Manipulator Path Control – Robot Dynamics – Configuration of a Robot controller.

UNIT – IV [10 HRS]

Robot End Effectors and Sensing: Types of End effectors – Grippers – Tools and End effectors – Robot/End effector interface – Gripper selection Sensors – Range sensing – Proximity Sensing – Touch Sensors – Force and Torque sensisng.

UNIT – V [10 HRS]

Low –level and High-level Vision: Image acquisition – Illumination techniques – Imaging geometry – Basic relationships between pixels – Preprocessing.
Segmentation – Description – Segmentation and description of three Dimensional structures – Recognition and Intrepretation.

TEXT BOOKS:

1. Mikell.P.Groover, M.Weiss, R.R.Nagel and N.G.Ordey, "Industrial Robotics", McGrawHill, 1986.

REFERENCE BOOK:

1. K.S.Fu, R.C. Gonzalez and C.S.G.Lee, "Robotics", McGrawGill, 1987.

Department of Electronics and Communication

Course **: BE (PART - TIME)** Branch: **ECE**

Sub. Code: EBPL7BE083F **Credit - 4**

(For students admitted from 2008-09 onwards)

Subject: SATELLITE COMMUNICATION [Elective]

Pre - requisite: Analog and Digital communication.

Objectives: To know the set up of a satellite launching agency & various standards of communication and link design.

UNIT – I [10HRS]

ORBIT DYNAMICS:

Kepler's Law, Newton's Law, orbital parameters, orbital perturbations, geo stationary and non geo stationary orbits, station keeping, frequency allocation, frequency coordination and regulatory services, sun transit ourages, limit of visibility. Launching vehicles and propulsion.

UNIT – II [10HRS]

SPACE SEGMENT:

Space craft configuration, communication payload and supporting subsystems, satellite uplink – down link, Space Link: Link power budget, System Noise, C / N Ratio, G/T, Noise temperature, Propagation factors, rain and ice effects, polarization.

UNIT – III [10HRS]

SATELLITE ACCESS:

Modulation and Multiplexing : Voice, data, Video, Analog – digital transmission system, Digital Video Broadcast. Multiple Access : FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum Communication.

UNIT – IV [10HRS]

EARTH SEGMENT:

Transmitters, Receivers, Antennas, Terrestrial Interface, TVRO, MATV, CATV, Equipment Measurements on G/T, C / N, EIRP, Antenna Gain.

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UNIT – V [10HRS]

SATELLITE APPLICATIONS:

INTELSAT Series, INSAT, VSAT, Facsimile System, Weather Service, Remote Sensing, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System, Direct Broadcast Satellites, Direct to Home Broadcast

TEXT BOOK:

1. Debnis Roddy : "Satellite Communications", Mc Graw Hill, III Edn, 2001
3. W.L. Pritchard and J. A. Sciulli: *Satellite Communication System Engineering*. Prenatice Hall, 1993.

REFERENCE BOOKS:

1. B.N. Agrawal: *Design of Geosynchronous Spacecraft*. Prentice Hall.
2. R.F. Filipowasky and E.K. Muchidrof: *Space Communication Systems*. McGraw Hill.
3. Bhargava Etal : *Digital Communication by Satellite*. Prentice Hall.
4. K. Miya : *Satellite Communications Technology*. Lattice and Company.
5. E. Fthenakis: *Manual of Satellite Communications*. McGraw Hill.
6. T. Pratt and C.W. Bostian: *Satellite Communication*. Wiley