SRI CHANDRASEKHARENDRA SARASWATHI

VISWA MAHAVIDYALAYA UNIVERSITY

(University Established under section 3 of UGC Act 1956)

Enathur, Kanchipuram - 631561

SCSVMV
UNIVERSITY

CURRICULAM FOR

B.E (Electronics & Communication Engineering)

FULL TIME PROGRAMME

CHOICE BASED CREDIT SYSTEM

(For Candidates admitted from the year 2010 onwards)

DEPARTMENT OF
ELECTRONICS & COMMUNICATION ENGINEERING

CHOICE BASED CREDIT SYSTEM FOR
BE (ELECTRONICS AND COMMUNICATION ENGINEERING)
FULL – TIME PROGRAMME

Credits

Each course is normally assigned one credit per lecture per week and one credit for two periods of tutorials or part thereof for laboratory or practical per week.

Each semester curriculum shall normally have a blend of theory and practical courses. In the first year the total number of credits will be 40. For Semester III to VIII the average credits per semester will be 28 and total credits for the entire degree course be 212. For the award of the degree a student has to earn a minimum of 200 credits.

Duration of the programme

A student is normally expected to complete BE (ECE) programme in four years but in any case not more then seven years from the time of admission.

Registration for courses

A newly admitted student will automatically be registered for all the courses prescribed for the first year, without any option.

Every other student shall submit a completed registration form indicating the list of courses intended to be credited during the next semester. This registration will be done a week before the last working day of the current semester. Late registration with the approval of the dean on the recommendation of the head of the department along with a late fee will be done, up to the last working day.

Registration for the project work shall be done only for the final semester.

Assessment

The break-up of assessment and examination marks for theory subjects is as follows,

First Assessment (Test)	:	20 Marks
Second Assessment (Test)	:	20 Marks
Assignments & Seminar	:	20 Marks
Examination	:	40 Marks

The break-up of the assessment and examination marks for practical is as follows.

Continuous Assessment (test)	:	30Marks
Mini project/ Design	:	15 Marks
Maintenance of record book	:	15 Marks
Examination	:	40 Marks

The project work will be assessed for 60 marks by a committee consisting of the guide and a minimum of two members nominated by the head of the department. The head of the department may himself be a member or the chairman. 40 marks are allotted for the project work and viva voce examination at the end of the semester.

Student counselor

To help the students in planning their course of study and for general advice on the academic programme, the head of the department will attach a certain number of students to a member of the faculty who shall function as student counselor for those students throughout their period of study. Such student counselors shall advise the students, give preliminary approval for the courses to be taken by the students during each semester and obtain the final approval of the head of the department.

Class committee

For all the branches of study during the first year, a common class committee will be constituted by the dean of the faculty. From among the various teachers teaching the same common course to different classes during the first year, the dean shall appoint one of them as course co-ordinator. The composition of the first year class committee will be as follows,

- Course coordinators of all common courses.
- Teaching staff of all other individual courses.
- All heads of the department, among whom one may be nominated as chairman by the dean.
- The dean may opt to be a member or the chairman.

For each of the higher semesters, separate class committees will be constituted by the head of the department. The composition of the class committees from third to eighth semesters will be as follows,

- Course co-ordinators of the common courses, if any, who shall be appointed by the head of the department from among the staff members teaching the common course.
- A project co-ordinator (in the eighth semester committee only) who shall be appointed by the head of the department from among the project supervisors.
- Teaching staff of other individual courses
- One professor or reader, preferably not teaching the concerned class, appointed by the head of the department from among the project supervisors.
- The head of the department may opt to be a member or the chairman.
- All student counselors of the class, and the head of the department (if not already a member) or any staff member nominated by the head of the department may opt to be special invitees.

The class committee shall meet four times during the semester.

The first meeting will be held within two weeks from the date of class commencement in which type of assessment like test, assignment, etc for the first and third assessments and the dates of completion of the assessments will be decided.

The second meeting will be held within a week after the completion of the first assessment to review the performance and for follow-up action. The second assessment will be the mid-semester test.

The third meeting will be held within a week after the second assessment is completed to review the performance and for follow-up action.

The fourth meeting will be held after all the assessments are completed for all the courses, and at least one week before the commencement of the examinations. During this meeting the assessment on a maximum of 60 marks will be finalized for every student and tabulated and submitted to the head of the department (to the dean in the case of first year) for approval and transmission to the controller of examinations.

Withdrawal from a course

A student can withdraw from a course at any time before a date fixed by the head of the department prior to the second assessment, with the approval of the dean of the faculty on the recommendation of the head of the department.

Temporary break of study

A student can take a one-time temporary break of study covering the current year / semester and / or the next semester with the approval of the dean on the recommendation of the head of the department, not later than seven days after the completion of the mid-semester test. However, the student must complete the entire programme within the maximum period of seven years.

Movement to higher semesters

The following minimum credits must be earned by the student to move to a higher semester.

- To move to the fifth semester : 45 credits

Substitute assessment

A student, who has missed, for genuine reasons accepted by the head of the department, one or more of the assessments of a course other than the examination, may take a substitute assessment for any one of the missed assessments. The substitute assessment must be completed before the date of the fourth meeting of the respective class committees.

A student who wishes to have a substitute assessment for a missed assessment must apply to the head of the department within a week from the date of the missed assessment.

Attendance requirements

To be eligible to appear for the examination in a particular course, a student must put in a minimum of 80% of attendance 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 fee.

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 the absolute mark basis will be considered and pass by the results passing board in accordance with the rules of the university. Thereafter, the controller of examinations shall convert the marks for each courses 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 the course - Grade 'W'

A student who obtains less than 50 marks out of 100 in the subject 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 the 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 examination 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 calculating the grade point average,

S – 10; A-9; B-8; C-7; D-6; E-5; 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 retotalling of one or more of his examination answer papers within a week from the date of issue of grade sheet to the student on payment of the 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 card 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 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 earn a minimum of 200 credits within four years from the time of admission, pass all the courses in the first attempt and obtain a CGPA of 8.25 or above.
- For First Class the student must earn a minimum of 200 credits within five years from the time of admission and obtain a CGPA of 6.5 or above.
- For Second Class the student must earn a minimum of 200 credits within seven years from the time of admission.

Electives

Among from the various elective courses offered in the curriculum of the branch of specialization, a student can choose a maximum of four electives from any group under the faculty during the entire period of study, with the approval of the head of the department and the head of the department offering the course.

SRI CHANDRASEKHARENDRA SARASWATHI VISWA MAHA VIDYALAYA UNIVERSITY

COURSE CONTENT AND SCHEME OF EXAMINATION

MODIFIED CURRICULUM AS ON AUGUST 2010

(EFFECTIVE FOR BATCH 2010 ONWARDS)

List of COURSES [Full-time B.E.(ECE)]

SEMESTER – III

S.NO	SUB. CODE	SUBJECT	L	T	P	C	IA	E	TM	DE
1.	EBU3FT091	ENGINEERING MATHEMATICS- III	4	1	-	3	60	40	100	3Hrs
2.	EBL3BT082	DIGITAL ELECTRONICS	4	1	-	3	60	40	100	3Hrs
3.	EBL3BT083	ELECTRON DEVICES AND CIRCUITS	4	-	-	4	60	40	100	3Hrs
4.	EBL3CT084	ELECTRICAL ENGINEERING	4	-	-	3	60	40	100	3Hrs
5.	EBL3BT085	CIRCUIT THEORY	4	1	-	3	60	40	100	3Hrs
6.	EBL3BT086	NETWORK THEORY AND TRANSMISSION LINES	4	1	-	3	60	40	100	3Hrs
7.	EBU3JT057	SANSKRIT & INDIAN CULTURE	2	-	-	1	100	-	100	2Hrs
8.	-	SOFT SKILL / COMMUNICATION	2	-	-	-	-	-	-	-
9.	EBL3BP081	ELECTRONICS LAB – I	-	-	3	3	60	40	100	3Hrs
10.	EBL3CP082	ELECTRICAL ENGINEERING LAB	-	-	3	3	60	40	100	3Hrs

TOTAL CREDITS: 26

SEMESTER – IV

S.NO	SUB. CODE	SUBJECT	L	T	P	C	IA	E	TM	DE
1.	EBU4FT091	ENGINEERING MATHEMATICS - IV	4	1	-	3	60	40	100	3Hrs
2.	EBL4BT082	SIGNALS AND SYSTEMS	4	1	-	4	60	40	100	3Hrs
3.	EBL4BT083	ELECTROMAGNETIC THEORY AND WAVE GUIDES	4	1	-	4	60	40	100	3Hrs
4.	EBL4BT084	ANALOG ELECTRONICS	4	-	-	4	60	40	100	3Hrs
5.	EBL4BT085	CONTROL SYSTEMS	4	1	-	4	60	40	100	3Hrs
6.	EBL4AT086	OBJECT ORIENTED PROGRAMMING USING C++	4	-	-	3	60	40	100	3Hrs
7.	EBU4JT057	SANSKRIT & INDIAN CULTURE	2	-	-	1	100	-	100	2Hrs
8.	-	SOFT SKILL / COMMUNICATION	2	-	-	-	-	-	-	-
9.	EBL4BP081	ANALOG ELECTRONICS LAB	-	-	3	3	60	40	100	3Hrs
10.	EBL4AP082	OBJECT ORIENTED PROGRAMMING USING C++ LAB	-	-	3	3	60	40	100	3Hrs

TOTAL CREDITS: 29

SEMESTER – V

S.NO	SUB. CODE	SUBJECT	L	T	P	C	IA	E	TM	DE
1.	EBL5BT081	MEASUREMENTS AND INSTRUMENTATION	4	1	-	4	60	40	100	3Hrs
2.	EBL5BT102	PRINCIPLES OF MANAGEMENT AND PROFESSIONAL ETHICS	4	1	-	3	60	40	100	3Hrs
3.	EBL5FT093	NUMERICAL METHODS AND STATISTICS	4	1	-	3	60	40	100	3Hrs
4.	EBL5BT084	DIGITAL SIGNAL PROCESSING AND ADSP	4	1	-	4	60	40	100	3Hrs
5.	EBL5BT105	MICROPROCESSOR AND MICRO CONTROLLER	4	-	-	4	60	40	100	3Hrs
6.	EBL5BT086	PRINCIPLES OF COMMUNICATION	4	-	-	4	60	40	100	3Hrs
7.	EBU5JT057	SANSKRIT & INDIAN CULTURE	2	-	-	1	100	-	100	2Hrs
8.	-	SOFT SKILL / COMMUNICATION	2	-	-	-	-	-	-	-
9.	EBL5BP101	MICROPROCESSOR AND MICRO CONTROLLER LAB I	-	-	3	4	60	40	100	3Hrs
10.	EBL5BP082	COMMUNICATION LAB	-	-	3	4	60	40	100	3Hrs

TOTAL CREDITS: 31

SEMESTER – VI

S.NO	SUB. CODE	SUBJECT	L	T	P	C	IA	E	TM	DE
1	EBL6FT101	PROBABILITY THEORY AND STOCHASTIC PROCESSES	4	1	-	3	60	40	100	3Hrs
2	EBL6BT082	MICROWAVE ENGINEERING	4	1	-	4	60	40	100	3Hrs
3	EBL6BT103	OPTICAL COMMUNICATION	4	-	-	4	60	40	100	3Hrs
4	EBL6BT104	COMPUTER ARCHITECTURE	4	1	-	4	60	40	100	3Hrs
5	EBL6BT105	COMMUNICATION NETWORKS	4	-	-	4	60	40	100	3Hrs
6	EBL6BT086	ANTENNA AND PROPAGATION	4	-	-	4	60	40	100	3Hrs
7	EBU6JT057	SANSKRIT & INDIAN CULTURE	2	-	-	1	100	-	100	2Hrs
	-	SOFT SKILL / COMMUN ICATION	2	-	-	-	-	-	-	-
8	EBL6BP081	MICROWAVE AND OPTICS LAB	-	-	3	4	60	40	100	3Hrs
9	EBL6BP102	MICRO PROCESSOR AND MICROCONTROLLER LAB II	-	-	3	4	60	40	100	3Hrs

TOTAL CREDITS: 32

SEMESTER – VII

S.NO	SUB. CODE	SUBJECT	L	T	P	C	IA	E	TM	DE
1.	EBL7BT081	DIGITAL COMMUNICATION	4	1	-	4	60	40	100	3Hrs
2.	EBL7BT102	CELLULAR MOBILE COMMUNICATIONS	4	1	-	4	60	40	100	3Hrs
3.	EBL7BT083	BROADCASTING & TELECASTING SYSTEMS	4	1	-	4	60	40	100	3Hrs
4.	EBL7BT084	COMPUTER AIDED SYSTEM DESIGN	4	1	-	4	60	40	100	3Hrs
5.	Refer Annexure	ELECTIVE – I	4	1	-	4	60	40	100	3Hrs
6.	Refer Annexure	ELECTIVE – II	4	1	-	4	60	40	100	3Hrs
7.	EBL7BP081	DIGITAL COMMUNICATION LAB	-	-	3	4	60	40	100	3Hrs
8.	EBL7BP082	COMPUTER AIDED SYSTEM DESIGN LAB	-	-	3	4	60	40	100	3Hrs

TOTAL CREDITS: 32

SEMESTER – VIII

S.NO	SUB. CODE	SUBJECT	L	T	P	C	IA	E	TM	DE
1.	EBL8BT081	VLSI DESIGN	4	1	-	4	60	40	100	3Hrs
2.	Refer Annexure	ELECTIVE - III	4	1	-	4	60	40	100	3Hrs
3.	Refer Annexure	ELECTIVE - IV	4	1	-	4	60	40	100	3Hrs
4.	EBL8BP081	PROJECT WORK	-	-	15	10	60	40	100	3Hrs

TOTAL CREDITS: 22

TOTAL CREDIT (from III sem. to VIII sem.) = 172 UNITS

TOTAL CREDIT (from I Year to IV year) = 212 UNITS

L – LECTURE

T – TUTORIAL

P – PRACTICAL

C – CREDITS

IA – INTERNAL ASSESSMENT

E -- EXTERNAL ASSESSMENT

TM – TOTAL MARKS

DE–DURATION OF EXAMINATION

List of ELECTIVES [Full-time B.E. (ECE)]

Elective - I (for VII Semester)	EBL7BE085A	ROBOTICS
	EBL7BE085B	SPEECH SIGNAL PROCESSING
	EBL7BE105C	TELECOMMUNICATION SWITCHING SYSTEMS
	EBL7BE105D	POWER ELECTRONICS
Elective - II (for VII Semester)	EBL7BE086A	BIO – MEDICAL SIGNAL PROCESSING
	EBL7BE106B	EMBEDDED SYSTEMS
	EBL7BE086C	DIGITAL IMAGE PROCESSING
	EBL7BE106D	PROCESS CONTROL INSTRUMENTATION
Elective - III (for VIII Semester)	EBL8BE082A	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS
	EBL8BE102B	WIRELESS COMMUNICATION SYSTEMS
	EBL8BE082C	ENGINEERING ACOUSTICS
	EBL8BE082D	RADAR AND NAVIGATIONAL AIDS
Elective - IV (for VIII Semester)	EBL8BE083A	CODING THEORY AND CRYPTOGRAPHY.
	EBL8BE083B	NEURAL NETWORKS AND FUZZY LOGIC
	EBL8BE083C	PRINCIPLES OF NANO TECHNOLOGY
	EBL8BE103D	SATELLITE COMMUNICATION AND BROADCASTING

List of SANSKRIT & INDIAN CULTURE courses [Full-time B.E. (ECE)]

Year	Semester	Sub. Code	Paper	Subject	Period	Credits
II	Third	C039T027	2	Mahabharata Eloquence (45 Slokas)	15	1P.W
		C039T027	2	And Elements of Indian Culture & Science and Technology	15	1 (2P.W)
	Fourth	C049T027	3	Hitopadesha (Selected Stories)	15	1 P.W
		C049T027	3	And Elements of Indian Culture & Science and Technology	15	1 (2P.W)
III	Fifth	C059T027	4	Raghuvamsa (II Canto 45 Slokas)	15	1 P.W
		C059T027	4	And Elements of Indian Culture & Science and Technology	15	1 (2P.W)
	Sixth	C069T027	5	Introduction in to Sanskrit Literature (Selected topics)	15	1 P.W
		C069T027	5	And Elements of Indian Culture & Science and Technology	15	1 (2P.W)

EXAMINATION PATTERN FOR SANSKRIT & INDIAN CULTURE SUBJECTS

(Students who have admitted during academic year 2002 onwards & Common for all branches)

There will not be any external examination for Sanskrit and Indian culture paper to B.E courses but performance of students will be assessed through tests and assignments conducted by the same department. The internal assessment pattern is as follows,

	Indian culture	Sanskrit
First test	20 Marks	20 Marks
Second test	20 Marks	20 Marks
Assignment	10 Marks	10 Marks
Total	50 Marks	50 Marks

Total Marks for Sanskrit and Indian culture : 100 Marks

Passing Minimum marks : Aggregate 50%

A Candidate shall be declared to have passed the examination he/she should have secure a minimum mark of 50% in each part (Sanskrit & Indian Culture) with the aggregate of 50%

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **III** Sub. Code: **EBU3FT091** Credit :**3**

(For students admitted from 2010 onwards)

Subject: ENGINEERING MATHEMATICS - III

(B.E. THIRD SEMESTER - COMMON FOR ALL BRANCHES EXCEPT EEE)

UNIT I - (ANALYTIC FUNCTIONS)

Introduction - Limit and continuity of $f(z)$ - Derivative of $f(z)$ - Cauchy-Riemann equations – Analytic functions – Harmonic functions - Orthogonal system – Applications to flow problems – Conformal transformation – Standard transformations: Translation, Magnification and rotation, Inversion and reflection and Bilinear transformation - Special conformal transformations : $e^z, z^2, z+\frac{1}{z}$, sin z.

UNIT II - (COMPLEX INTEGRATION)

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

UNIT III- (LAPLACE TRANSFORMS)

Introduction - Definition - Existence conditions - Transforms of elementary functions - Properties of Laplace transforms - - Transforms of derivatives - Transforms of integrals - Multiplication by t^n - Division by t - Evaluation of integrals by Laplace transform - Inverse transforms – Other methods of finding inverse - Convolution theorem (Without proof) - Application to differential equations.

UNIT –IV (FOURIER TRANSFORMS)

Introduction – definition – Fourier integrals - Fourier Sine and Cosine integral – complex forms of Fourier integral - Fourier transform – Fourier sine and Cosine transforms – properties of Fourier Transforms - Convolution theorem for Fourier Transforms - Parseval's identity for Fourier transforms. (without proof).

UNIT V (Z - TRANSFORM)

Introduction - Definition – standard Z –transforms – Linearity property – Damping rule – standard results – Shifting rules – Initial and final value theorems – inverse Z –transforms – Convolution theorem – Evaluation of inverse transforms – Application to difference equations.

Remark: Each Unit has to be covered in 12 hours (each of 50 minutes duration). Questions may be set to test the problem solving ability of the students in the above topics.

PRESCRIBED TEXT BOOK:

B.S.Grewal, Higher Engineering Mathematics, 40th Edition, Khanna Publishers, New Delhi, 2007.

REFERENCES

1. Erwin Kreyszig, Advanced Engineering Mathematics, Eighth Edition, John Wiley & Sons, 1999.
2. Veerarajan, T., Engineering Mathematics, Tata McGraw Hill, New Delhi, 2008.
3. Ronald N. Bracewell, The Fourier transform and its applications, McGraw Hill Company, 1986.
4. John H. Mathews, Russel W. Howell, Complex Analysis for Mathematics and Engineering, Third Edition, Narosa Publishing House, 1998.
5. Murry R. Spiegel, Complex Variables, (Schaum's Outline Series), McGraw Hill 1981.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **III** Sub. Code: **EBL3BT082** Credit: **3**

(For students admitted from 2010 onwards)

Subject: DIGITAL ELECTRONICS

Pre - requisite: Binary Mathematics

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

UNIT - I [12 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 [12 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 [12 Hrs]

Boolean Algebra: Introduction to Boolean algebra - The 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 [12 Hrs]

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 [12 Hrs]

Synchronous sequential circuits: Basic latch circuits - Flip-flop-s, 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

Asynchronous Sequential Circuits – State Reduction, Multiple Inputs.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Heiser Man: *Handbook of Digital IC applications*, Prentice Hall.
2. D.J. Comer: *Digital Logic and State Machine Design*, HOLT-SAUN-DERS.
3. T.L. Floyd: *Digital Fundamentals*, Prentice Hall of India.3/e

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **III** Sub. Code: **EBL3BT083** Credit: **4**

(For students admitted from 2010 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 [12 Hrs]

Junction Diodes: Energy-band diagram - pn junction - junction diode - volt - ampere characteristic - 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 -photodiodes - photovoltaic cell - LED and LCD - voltage multiplier circuit.

UNIT - II [12 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 [12 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 [12 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.

Frequency response of amplifiers: Low frequency response of BJT,FET amplifiers-Miller effect capacitance-High frequency response of BJT, FET amplifiers- Multistage amplifiers – effects of cascading on gain and BW – Darlington pair and cascade amplifiers.

UNIT-V [12 Hrs]

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

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** Branch: **ECE** Semester: **III** Sub. Code: **EBL3CT084** Credit: **3**

(For students admitted from 2010 onwards)

Subject: ELECTRICAL ENGINEERING

UNIT – I [12 Hrs]

D.C. Machines: Construction, principle of operation of D.C. motor and D.C. Generator, Various types of D.C. motors and generators. Performance characteristics of D.C. motors and D.C. generators. Starting and speed control.

UNIT – II [12 Hrs]

Transformers: Construction details and principles of operation of single phase transformers - losses and efficiency. Special types of transformers - Servo stabilizer, pulse transformer, Isolation transformer

UNIT – III [12 Hrs]

Synchronous Machines: Constructional features - operating principle of 3-phase alternator and synchronous motor principle and operation of synchronous motor

UNIT – IV [12 Hrs]

Induction Machine: Constructional features - Operating principle of 3-phase induction motor [squirrel cage and slip ring] and single phase induction motor, Slip - Torque characteristics - Starters - Speed control methods.

UNIT – V [12 Hrs]

Special Machines: Tachogenerator - A.C and D.C. Servo motor, Stepper motor, synchronous– PWM Methods. Linear induction motor – switched reluctance motor, Brushless motors.

Text Book:

1. B.L.Theraja : *Electrical Technology* Vol.II 1993
2. Rajput: Electrical Machines 2004, Laxmi Publications

REFERENCE BOOKS:

1. M.G. Say and Taylor: *D.C. Machines ELBS 1980*.
2. M.G. Say: *Alternating Current Machines ELBS 1980*.
3. E.V. Armensky and G.B. Falk: *Fractional Horsepower Electrical Machines.*
4. B.R. Sharma: *Utilization of Electrical Energy* [Satyaprakashan Publications 1992]
5. B. Ravindranath and M. Chander: *Power system Protection and Switchgear* [Wiley Eastern Ltd.]
6. C.R. Paul, S.A. Nasar and L.E. Unnewehr: *Introduction to Electrical Engineering* , McGraw Hill Inc., 1992.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **III** Sub. Code: **EBL3BT085** Credit: **3**

(For students admitted from 2010 onwards)

Subject: CIRCUIT THEORY

Pre-requisite: knowledge of Ohm's Law and Engineering Mathematics (Calculus)

Objectives: To calculate V, I, P in a circuit and construct Filters and analyse time and frequency

UNIT - I [12 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 [12 Hrs]

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

UNIT - III [12 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 and logarithmic decrement - response of circuits or non sinusoidal periodic inputs.

UNIT - IV [12 Hrs]

Coupled and Three Phase 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 - three phase circuits - balanced circuits - star and delta connected loads - unbalanced circuits - solution of unbalanced star and delta connected loads - power measurement by two - wattmeter method.

UNIT - V [12 Hrs]

Two- Port Network and Filters: Driving point and transfer impedances / admittance's voltage and current rations of two port networks - admittance, impedance, hybrid, transmission and image Parameters for two - port networks - impedance matching - equivalent pi and T networks - 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 and Communication

Course: **BE** Branch: **ECE** Semester: **III** **Sub. Code:** EBL3BT086 **Credit:** 3

(For students admitted from 2010 onwards)

Subject: NETWORK THEORY AND TRANSMISSION LINES

Pre - requisite: Circuit Theory.

Objectives: Analog Filter construction (base band), Impedance matching at radio frequencies.

UNIT –I [12 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 [12 HRS]

Poles and Zeros of network functions – Location of poles and zeros in the complex plane – Transfer functions – properties of all network functions – Time domain response – Stability-Routh's Criterion. Short circuit admittance parameters open circuit impedance parameters, Transmission parameters, Hybrid parameters and Image and iterative parameters. Parameter conversion.

UNIT –III [12 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 –IV [12 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 –V [12 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.

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** Branch: **ECE** Semester: **III** Sub. Code: **EBU3JT057** Credit - **1**

(For students admitted from 2010onwards)

Subject: SANSKRIT AND INDIAN CULTURE

C039T027 – SANSKRIT

(Syllabus for Third Semester B.E.)

UNIT – 1: Mahabharatha eloquence 1 to 9 verses.
UNIT – 2: Mahabharatha eloquence 10 to 18 verses.
UNIT – 3: Mahabharatha eloquence 19 to 27 verses.
UNIT – 4: Mahabharatha eloquence 28 to 36 verses.
UNIT – 5: Mahabharatha eloquence 37 to 45 verses.

CO39T027-INDIAN CULTURE - II

(Syllabus for Third Semester B.E.)

Part I

Unit I – importance of smrits & sutras ; significance of Manu's smrits & grihya sutran;

Unit II – Samskaras or Sacraments – defination & significance; Sixteen important Samskaras in due course of human life special reference to the Hindu. Four Ashrama Dharmas.

Unit III – Worship & Festivals – Worship – Personal and public worships; sixteen different kinds of *poojas*; *tantra* and *mudras* in *pooja*; significance and different types of Yajnas, utensils and requirements. important sacred places and cultural centres; significance of festivals and impact on culture.

Part II

Unit IV – Importance and significance of Upavedas.
Unit V – Special reference to Ayurveda and Arthasastra.

REFERENCE BOOKS:

1. Acharya, D. 1999. *Dharnuveda* (sub-Veda of Yajurveda). Hindi. Vijaya Kumar Govindram Harsanand. Delhi.
2. Kangle, R.P. 1992 (rp). *The Kautilya Arthasastra.* Delhi.
3. Rao, S.K.R. 1994. *Nityarchana*. Agama-kosha (Agam Encyclopaedia). Kalpatharu Research Academy Publications. Vol X. Banglore.
4. Ray, P. (tr). 1997. *Vasistha's Dhanurveda Samhita*. J.J. Publishing House. Delhi.
5. Shalini, K. 1997. *Vedic Leguminous Plants* (Medical and Microbiological Study). Classical Publishing Company. New Delhi.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **III** Sub. Code: **EBL3BP081** Credit: **3**

(For students admitted from 2010 onwards)

Subject: **ELECTRONICS LAB - 1**

1. Characteristics of diodes [PN junction diode, Zener diode and Tunnel diode]
2. Input and Output characteristics of BJT [CE , CB and CC]
3. Characteristics of JFET / MOSFET.
4. Characteristics of UJT / PUT.
5. Characteristics of SCR & TRIAC
6. Characteristics of LDR, Photo-diode and Photo-transistor.
7. Study of Logic Circuits: AND, OR, NOT, NAND, NOR, EX-OR, FFs
8. Combinational logic circuits: Adder/Subtractor
9. Sequential logic circuits: Counters/ Registers/ Ring counters
10. Multiplexers / Demultiplexers.
11. Code converters
12. Single and Multiple digit decoding / display
13. Switching characteristics of BJT
14. Measurements of hybrid – II parameters
15. Bias stabilization and compensation.
16. Diode – Clipper, Clamper, Rectifier.
17. RC Coupled Amplifier – Frequency Response.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **III** Sub. Code: **EBL3CP082** Credit: **3**

(For students admitted from 2010 onwards)

Subject: ELECTRICAL ENGINEERING LAB

1. Series and parallel resonance
2. Measurement of Active power, Reactive power, PF using Wattmeter.
3. Measurement of R, L, C Using Bridge.
4. Load test on DC shunt motor
5. Load test on DC series motor
6. Speed control of DC shunt motor
7. Load test on DC shunt generator
8. Load test on 3 phase squirrel cage Induction motor
9. Load test on single phase transformer
10. Control of servomotor. (AC/DC)
11. Control of Stepper Motor.
12. Load test on Synchronous Generator.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **IV** Sub. Code: **EBU4FT091** Credit :**3**

(For students admitted from 2010onwards)

Subject: ENGINEERING MATHEMATICS -IV

UNIT I (FOURIER SERIES)

Introduction - Euler's Formulae – Condition for Fourier expansion – Functions having points of discontinuity – Change of interval – Odd and Even functions - Half-Range series – Parseval's formula.

UNIT II (PARTIAL DIFFERENTIAL EQUATIONS)

Introduction - Formation of PDE – Solution of PDE – Equations solvable by direct integration – Linear equations of first order - Homogeneous linear equations with constant coefficients –Complementary Function –Particular Integral – solution of Homogeneous linear equation of any order – Non-homogeneous linear equations.

UNIT III (APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS - I)

Introduction - Method of separation of variables – Vibration of a stretched string – Wave Equation – D'Alembert's solution of the wave equation.

UNIT IV (APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS - II)

One dimensional heat flow equation – Two dimensional heat flow equation – Solution of Laplace equation – Temperature distribution in long plates.

UNIT V (CALCULUS OF VARIATIONS)

Introduction – Functionals – solution of Euler's equation – geodesic – isoperimetric problems – several dependant variables – functionals involving higher order derivatives – Rayleigh-Ritz method.

Remark: Each Unit has to be covered in 12 hours (each of 50 minutes duration). Questions may be set to test the problem solving ability of the students in the above topics.

PRESCRIBED TEXT BOOKS

B.S.Grewal, Higher Engineering Mathematics, 40th Edition, Khanna Publishers, New Delhi, 2007.

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. Ockendon, Howison, Lacey, Movchan, Applied Partial Differential Equations, Oxford University Press, 1999.
4. T. Veerarajan, Engineering Mathematics, (for semester III), 3rd Edition, Tata McGraw-Hill, New Delhi, 2005.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **IV** Sub. Code: **EBL4BT082** Credit: **4**

(For students admitted from 2010 onwards)

Subject: SIGNALS AND SYSTEMS

Pre - requisite: Calculus, Differential equations

Objectives: To analyse analog periodic, non-periodic signals in frequency domain, to analyse discrete signals in frequency domain.

UNIT – I [12 HRS]

Continuous and Discrete Time Signals: Continuous time signal – Discrete time signals – Representation of signals: step, ramp, pulse, impulse, exponential – Classification of continuous time signals and discrete time signals – periodic, aperiodic, random signals – Continuous time systems and Discrete time systems - classification of systems – Linear invariant systems.

UNIT – II [12 HRS]

Fourier Series Analysis: Fourier series Analysis – Representation of periodic signals in exponential and trignometric forms – Spectrum of continuous time signals: Properties – Fourier Transform and Laplace Transforms in signal analysis, Hilbert Transform.

UNIT – III [12 HRS]

Signal Analysis: Differential Equation – Block diagram Representation, reduction techniques – Impulse response – Convolution Integral – Parsevals theorem – Frequency response, Fourier Methods and Laplace Transforms in analysis – State variable equations and Matrix.

UNIT – IV [12 HRS]

Spectrum of Discrete signals: Spectrum of discrete time signals – Discrete Time Fourier Transform – Discrete Fourier Transform – Properties – Z-Transform in signal analysis.

UNIT – V [12 HRS]

Transforms And Applications: Difference equations, Block Diagram representation, Impulse response, Convolution sum, Frequency response, Fast Fourier Transform and Z – transform – Properties – Z -Transform in signal analysis, State variable equation and matrix.

TEXT BOOK:

1. Robert A.Gabel and Richard A.Roberts, Signals and Linear Systems John wiley and sons 3ed, 1987.

REFERENCE BOOKS:

1. Allam V. Oppenheim et al. Signals and systems , Prentice Hall of India Pvt.Ltd.,1992
2. Roger E.Ziemer et al, Signals and systems continuous and Discrete, Mc Millan 2ed, 1990.

Department of Electronics and Communication

Course: **BE** Branch**: ECE** Semester: **IV** Sub. Code: **EBL4BT083** Credit: **4**

(For students admitted from 2010 onwards)

Subject: ELECTROMAGNETIC THEORY & WAVEGUIDES

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 [12 Hrs]

Electrostatics: Electric charge – Coulomb's law – Electric field intensity – Linear, surface and volume charge density – Gauss law and its applications – Electric scalar potentials and potential difference - Potentials due to uniformly charged linear potentials between two co-axial cylinders and between two conducting spherical shells- Electric field lines and equipotential contours – potential gradient and electric field due to electric dipoles – Conservative nature of electric field. Dielectric boundaries – capacitance's – capacitance of system of conductors – Overhead lines and underground cables – Electrostatic energy and energy density – Force between charged conductors, dielectric strength and breakdown, divergence and curl of vector fields – Divergence theorem – Stoke's theorem – Solving of electrostatic problems.

UNIT – II [12 Hrs]

Steady Magnetic Fields: Magnetic field intensity and magnetic flux density – Biot savart's law – Force between current carrying wires – Torque on closed circuits – Ampere's law – Magnetic scalar potential and vector potentials – Boundary conditions at magnetic surfaces. Faraday's law of electromagnetic induction – Inductor and Inductance of solenoids, toroids transmission lines and cable – mutual inductance – inductors in series and parallel – Energy stored in magnetic field – poynting vector – poynting theorem.

UNIT – III [12 Hrs]

Electromagnetic Waves: Reflection and refraction of plane waves: Reflection and transmission of waves at a boundary for normal incidence – oblique incidence at a boundary between two dielectrics – Reflection and transmission for polarization with E in the plane of incidence – Total reflection – Brewster angle – oblique incidence on a conductor – Surface impedance.

UNIT – IV [12 Hrs]

Guided Waves: Waves between parallel planes. TE, TM, TEM waves and their characteristics – Attenuation in parallel plane guides for TE, TM and TEM waves – Wave impedances – Phase and group velocities.

UNIT V [12 Hrs]

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

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 and Communication

Course: **BE** Branch: **ECE** Semester: **IV** **Sub. Code: EBL4BT084** **Credit:** 4

(For students admitted from 2010 onwards)

Subject: ANALOG ELECTRONICS

Pre - requisite: Electronic devices and circuits.

Objectives: To construct Wide band amplifiers and Oscillators for Radio frequencies.

UNIT-I [12 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 [12 HRS]

Power amplifiers and Power supplies Classification-Class A, B, C class A –direct coupled, transformer coupled and push pull complementary symmetry amplifiers. Class AB and Class C amplifier. Half wave, full wave and bridge type rectifiers. Shunt capacitor filter. Shunt and series type regulators using BJT. Switched - mode power supplies. Voltage Regulator IC 723

UNIT – III [12 HRS]

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

UNIT – IV [12 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 [12 HRS]

Tuned and wide band amplifiers: Single tuned amplifiers-impedance matching to improve gain, Double tuned amplifiers – Synchronously tuned amplifiers – Gain BW product – Video amplifiers – 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** Branch: **ECE** Semester: **IV** Sub. Code: **EBL4BT085** Credit: **4**

(For students admitted from 2010 onwards)

Subject: CONTROL SYSTEMS

Pre - requisite: Circuit Theory.

Objectives: To construct Filters for feedback systems in control applications (analog and digital).

UNIT – I [12 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 [12 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 [12 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 [12 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 [12 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** Branch: **ECE** Semester: **IV** Sub. Code: **EBL4AT086** Credit: **3**

(For students admitted from 2010 onwards)

Subject: OBJECT ORIENTED PROGRAMMING USING C++

UNIT – I [12 HRS]

Need for object oriented programming, Characteristics of object oriented language - objects, classes, Inheritance, Reusability, creating new data types, Polymorphism and overloading. C++ programming basis – Data types, Manipulators, Cin, Cout, Type conversion, arithmetic operators, Loops and decisions.

UNIT – II [12 HRS]

Class and objects : A simple class, C++ Objects as physical Objects, C++ Objects as Data Types, Constructors, destructors, objects as function arguments, overloaded constructors, member functions defined outside the class, inline functions, Returning objects from Functions.

UNIT – III [12 HRS]

Arrays : Defining & accessing Array elements, arrays as class member data, array of Objects. Operator Overloading : Overloading Unary Operators, Operator Arguments, Return Values, nameless Temporary objects, postfix notations. Overloading Binary Operators - Arithmetic operators, Concatenating Strings, Multiple overloading Comparison operators, Arithmetic Assignment Operators.

UNIT – IV [12 HRS]

Inheritance-Derived class and base class, derived class constructors, overriding member functions, Class Hierarchies, Abstract base class, Public and private inheritance, Levels of inheritance, Multiple inheritance. Memory management – new and delete operator, a string class using new, Pointers to Objects – Referring to Members, another Approach to new, An array of pointers to Objects.

UNIT –V [12 HRS]

Virtual Functions – Pure virtual functions, Late Binding, Abstract Classes, Virtual base classes. Friend Functions – Friend Classes, Friends for functional Notation. Static Functions , investigating destructors. Assignment and copy – initialization- overloading the assignment operator, the copy constructor, the this pointer. Templates,function templates, class template.

TEXT BOOKS :

1. Object Oriented Programming in Microsoft c++ - Robert Lafore,Galgotia Publication Pvt Ltd.1998
2. Let us C++ - Yaswant Kanitkar(used for templates) ,BPB Publication

REFERENCE BOOKS :

1. Object Oriented Programming in C++ - C. Balagurusamy, Tata Mcgraw Hill.2/e 2001
2. Teach yourself C++ - Herbertsehildt, OSBORNE/MH

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **IV** Sub. Code: **EBU4JT057** Credit - **1**

(For students admitted from 2010 onwards)

Subject: SANSKRIT AND INDIAN CULTURE

C049T027 - SANSKRIT

Unit I

1.Hitopadesha Introduction 2.prologue 3.Important verses

A.**kao|qa-: pu~oNa** B.**gauiNagaNa** C.**]Vmaona**

Unit II

Mitralabha - acquisition of friends

1.Fable I (Old tiger and traveler) 2.Fable II (Cat and Vulture)

3.Important Slokas A.**maÉsqalyaama** B.**sa ih gagana** C.**tavad\Bayasya**

Unit III

Suhridbheda - separation of friends

1.Fable 7 (Pair of crows) 2.Fable 9 (pair of Tittibhas)

3.Important Slokas A.**]payaona** B.**A=\gaai=\gaBaava** C.**du:Kmaa%maa**

Unit IV

Vigraha - War

1.Fable 3 (Rabbits and elephants) 2. Fable 7 (Jackal) 3.Important Slokas A.**spRSannaip** B.**Aa%mapxama** C.**ya: svaBaavaao**

Unit V

Sandhi -Peace

1.Fable 6 (Crane and crab) 2.Fable 10 (Camel)

3.Important Slokas A.**]pk~a-irNaa** B.**%yajao%xauQaata-** C.**na BaUp`danama**

CO49T027-INDIAN CULTURE - III

(Syllabus for Fourth Semester B.E.)

Part I

UNIT I

Religion and different philosophical Schools - evolution of religious thoughts and ritual practices; astica and nastica sets; Jaina & Buddhist philosophy;

UNIT II

Bhakti Movement – evolution of trimurti tradition and Bhakti movement; Shankara, Ramanuja, Madhwa, Vellabha, Bhaskara, etc. personalities and their contribution in Indian philosophy; Alwars, Nayanmars, Kabir, Tulasi, Meera, Goswami, etc. and their role in Bhakti movement;

UNIT III

Important personalities and their Contribution – Devarishies, Maharishies, Rishies, Seers and contribution of their institutions to protect the cultural heritage.

PART II

UNIT IV

Significance of Yoga in daily life.

UNIT V

Vedic Mathematics, Astrology & Astronomy, Jyotism, etc. early Indian works and its importance in day to day life.

Reference Books

Datta, B. & A.N. Singh. 1962(rp). *History of Hindu Mathematics.* 2 Vols. Asian Publishing House. Bombay.

Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaj. 1994 *Vedic Mathematics*. Motilal Banarasidas. New Delhi.

Kulkarni, R.P. 1983. *Geometry according to Sulba Sutra*. Samsodhana Mandal. Pune.

Radhakrishna, S. 1993(rp). *Indian Philosophy*. Vol I & II. Oxford University Press. Delhi.

Rao, J. 1960. *Principles and Practices of Medical Astrology*. Raman Publications. Banglore.

Swami Satyananda Saraswati. 1997 (rp). *Asanas Pranayama Mudra Bandha*. Bihar Yoga Bharati. Bihar.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **IV** **Sub. Code**: **EBL4BP081** **Credit:** 3

(For students admitted from 2010onwards)

Subject: ANALOG ELECTRONICS LAB

DESIGNING, ASSEMBLING AND TESTING OF

1. RC Coupled amplifier.
2. Power amplifier - class AB.
3. HW and FW rectifiers with and without filters .
4. Voltage regulator -series and shunt type.
5. Emitter follower.
6. Differential amplifier.
7. Voltage and current feedback amplifiers.
8. IC 555 – Astable , Monostable Multivibrator
9. Schmitt Trigger using IC 741
10. OP- Amp – Amplifiers, Integrators, Differentiator
11. Wein's bridge oscillator

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **IV** Sub. Code: **EBL4AP082** Credit: **3**

(For students admitted from 2010 onwards)

Subject: OBJECT ORIENTED PROGRAMMING USING C++ LAB

1. Illustrate class & objects
2. To Demonstrate the use of Switch –Case statement and to Perform arithmetic operations.
3. To demonstrate the use of constructor and destructor.
4. To demonstrate the use of this poiter
5. To enter the records of n number of students and then display them using nested structure.
6. Illustrate the use of inline functions
7. Illustrate the use of Copy Constructor
8. Illustrate operator overloading
9. To demonstrate the concept of polymorphism applied to the member functions.
10. To demonstrate the use of Inheritance.
11. To demonstrate the use of Demonstration of New & Delete Operator
12. To demonstrate the Pure Virtual Function
13. To demonstrate the use of unary operator
14. To demonstrate the use of Binary operator
15. To demonstrate the use of Friend Function.
16. To demonstrate the use of class template

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **V** Sub. Code: **EBL5BT081** Credit: **4**

(For students admitted from 2010 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 [12 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, Introduction and Electrodynamometer.

UNIT- II [12 HRS]

SENSORS AND TRNASDUCERS:

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

UNIT - III [12 HRS]

DIGITAL INSTRUMENTS:

Digital Voltmeter system, Digital Multi meter, Digital Frequency Meter System. (Ch VI Text Book 2)

SIGNAL GENERATORS: LF Signal Generators, Function Generators, Pulse Generators, RF Signal Generators, Sweep Signal Generators, Sweep Frequency Generators, Frequency Synthesizers (Cha VII Text Book 2)

UNIT - IV [12 HRS]

DATA DISPLAY AND RECORDING SYSTEM:

Oscilloscope: CRO – CRT, Deflection System, Specifications, Controls, Storage Oscilloscope, Digital Storage, Sampling Oscilloscope. (Ch8 of Text Book 3)

Graphic Recording Instruments: Strip Chart Recorders, X_Y Recorder, Plotters. (Ch 13 of Text Book2)

UNIT - V [12 HRS]

WAVEFORM ANALYSING INSTRUMENTS:

Distortion Meter, Spectrum Analyser, Digital Spectrum Analyser, (Ch 14 of Text Book 2)

Radio Receiver Measurement : Receiver Basics and Parameters, Measuring Sensitivity, Selectivity and Image Response.(text Book 3)

TEXT BOOK:

1. Copper D: *Electronic Instrumentation and Measurement Techniques*, PHI
2. A.K. Sawhney: *A Course in Electrical and Electronic Measurements and Instrumentation*.

REFERENCE BOOKS:

1. Doeblin: *Measurement Systems - Application and Design*
2. Jones L.D. and Foster ChinA.:*Electronic Instruments and Measurements*, John Wiley and Sons.
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. Barney G.C. *Intelligent Instrumentation*, PHI

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **V** **Sub. Code: EBL5BT102** **Credit –** 3

(For students admitted from 2010onwards)

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

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **V** Sub. Code: **EBL5FT093** Credit **3**

(For students admitted from 2009-10)

Subject: NUMERICAL METHODS AND STATISTICS

UNIT I (SOLUTION OF ALGEBRAIC, TRANSCENDENTAL, AND SIMULTANEOUS EQUATIONS)

Introduction – Bisection method - The method of False position - Newton-Raphson Iterative method . Solution of linear simultaneous equations: Direct methods of solution – Gauss elimination method - Gauss – Jordan method – Iterative methods of solution : Jacobi's method , Gauss – Seidel method.

UNIT II (INTERPOLATION, NUMERICAL DIFFERENTIATION AND INTEGRATION)

Finite differences – Newton's interpolation formulae – Interpolation with unequal intervals – Lagrange's formula ; Newton's divided difference formula – Inverse interpolation – Numerical differentiation – Maxima and Minima of Tabulated functions - Numerical integration : Trapezoidal rule - Simpson's 1/3rd rule - Simpson's 3/8th rule.

UNIT III (NUMERICAL SOLUTION OF ODE AND PDE)

Numerical solution of ODE : Introduction — Euler's method – Modified Euler's method – Runge's method – Runge-Kutta method – Predictor-corrector method : Milne's method. Numerical solution of PDE: Introduction – Classification of second order equations – Finite difference approximation to derivatives – Elliptic equations – Solution of Laplace's equation – Solution of Poisson's equation – Parabolic equations – Solution of heat equation – Hyperbolic equations – Solution of wave equation.

UNIT IV (COLLECTION AND ANALYSIS OF DATA)

Classification and tabulation of data - Frequency tables - Graphical representation - Measures of central tendency : Averages, mean, median, mode, Geometric and harmonic means - Measures of dispersion : Range, quartile deviation, Mean deviation, Standard deviation - Relative distribution - Moments - Skewness - Kurtosis - Linear correlation - Coefficient of correlation - Grouped data : calculation of correlation coefficient - Rank correlation - Linear regression - Regression lines.

UNIT V (SAMPLING THEORY)

Procedure of testing hypothesis - Standard error - Sampling distribution - Tests of significance for attributes - Tests of significance for large and for small samples - Z-test of significance of coefficient of correlation - Conditions for applying chi square test - Uses of chi square test - Chi-Square test for specified value of population variance - The variance ratio test - Assumptions in F-test - Applications of F-test - Analysis of variance - Analysis of variance in two way classification model.

Remark: Each Unit has to be covered in 12 hours (each of 50 minutes duration). Questions may be set to test the problem solving ability of the students in the above topics.

PRESCRIBED TEXT BOOKS

1. B.S.Grewal, Higher Engineering Mathematics, 40th Edition, Khanna Publishers, New Delhi, 2007.
2. S.P. Gupta, Statistical Methods, 28th Edition, Sultan Chand and Sons., New Delhi, 1997.

REFERENCES

1. Ward Chenny, David Kincaid, Numerical Mathematics and Computing, Fourth Edition, Brookes and Cole Publishing Company, 1999.
2. George W. Snedecor, William G. Cocharan, Statistical Methods, Eighth Edition, Affiliated East West Press, 1994.

Department of Electronics and Communication

Course : **BE** Branch: **ECE** Semester: **V** **Sub. Code: EBL5BT084** **Credit –** 4

(For students admitted from 2010 onwards)

Subject: DIGITAL SIGNAL PROCESSING & ADSP

Pre - requisite: Signals and Systems.

Objectives: To construct Digital Filters and evaluate spectrum of signals for digital applications.

UNIT - I [12 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 - II [12 HRS]

Finite-Impulse Response [FIR] Filters: Introduction to Digital Filters, Advantages and Disadvantages of FIR Filters, Poles-Zeros of Linear Phase sequence, Magnitude response and phase response of digital filters. Linear phase response. Design techniques for FIR filters - Fourier series method and Frequency sampling method. Linear phase designs. Windows - Rectangular, Hamming . Hanning and Kaiser.

UNIT - III [12 HRS]

Infinite Impulse-Response[IIR] Digital Filters: Review of the properties of Butterworth and Chebychev filters of the continuous - time type . IIR digital filter design from continuous-time filters using Impulse Invariance technique and Bilinear transformation, Advantages and Disadvantages of IIR filters.

UNIT - IV [12 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 [12 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** Branch: **ECE** Semester: **V** Sub. Code: **EBL5BT105** Credit: **4**

(For students admitted from 2010 onwards)

Subject: MICROPROCESSOR AND MICROCONTROLLER

Pre - requisite: Digital Electronics.

Objectives: To design microprocessor based system.

UNIT – I Introduction to the 8085 Microrocessor

Microprocessor architecture and its operation, memory, I/O devices, 8085 microprocessor – Core architecture :Various registers:Bus Timings, Multiplexing and Demultiplexing of Address Bus, Decoding and Execution, Instruction set – Classification, Instruction Format, Addressing Modes, , 8085 Interrupt Process, Hardware and Software Interrupts.

UNIT – II Introduction to the 8051 Microcontroller

Architecture of 8051 and its addressing modes.Variouscontrol Registers:Instruction set – Classification, Instruction Format, Addressing Modes, Simple Assembly Language Programs for 8051. Programming the timer/counter and interrupt handling.

UNIT III-Peripherals and Interfacing

Principle of Operation & Initialization:- Command Words - PPI (8255), Timer (8253), PIC (8259), PCI (8251), Keyboard Display Interface IC (8279). Interfacing to ADC/DAC, stepper motor, and interfacing to memory.

UNIT – IV Assembly Language Programming

Simple Assembly Language Programs for the 8085 and 8051 processors involving internal registers and peripherals.

UNIT – V 16 bit processors-the 8086 Processor and the PIC Micro-controller

Core Architecture of the 8086-. Memory Segmentation, Minimum mode Operation and Maximum Mode Operation,Instruction Set of the 8086 processor-– Classification. Instruction Format Addressing modes, Simple Assembly Language Programs – Arithmetic operations, Data transfer, String Manipulation, Searching and Sorting.The architecture and instruction summary for the PIC Micro-controller.

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.

3.Muhammad Ali Mazidi and Janice Gillipse Mazidi , "The 8051 Micro controller and embedded systems" Pearson Education (Singapore) Pte.Ltd., VI Reprint.

4.John.B.Peatman, "Design with Microcontrollers' 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

5. Kenath J Ayala, " The 8051 Micro Controller Architecture, Programming and Application" II Edn.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **V** **Sub. Code:** EBL5BT086 **Credit**: 4

(For students admitted from 2010 onwards)

Subject: PRINCIPLES OF COMMUNICATION

UNIT – I (12 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 (12 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 (12 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 (12 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 (HRS)

Information Theory: Measure of Information, Entropy, Information Rate, Redundancy, Source Coding, Coding Efficiency, Shannon Fanon Coding, Huffmann Coding.
Error Control Coding – Introduction, Parity Coding, CRC, LRC, Linear Codes.

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** Branch: **ECE** Semester: **V** Sub. Code: **EBU5JT057** Credits – **1**

(For students admitted from 2010 onwards)

Subject: SANSKRIT AND INDIAN CULTURE

C059T027 - SANSKRIT

Unit I

I.rGauvaMSapircaya: II.p`QaanaSlaaoka: -

1.AnyaoVura%maanaucarsya Baavama\ 2.saa duYp`QaYaa- 3.tdIyamaaËindtma\ 4.ttao maRgaond`sya 5.vaamaotrstsya 6.tmaaya-gaR(ma\ 7.AlaM mauhIpala 8.kOlaasagaaOrma\ 9.AmauM pur: pSyaisa

UNIT II

I.p`QaanaSlaaoka: -

1.kNDUyamaanaona 2.tda p`BaR%yaova 3.tsyaalamaoYaa 4.sa %vaM inavat-sva 5.[it p`galBama\ 6.p`%yaba`vaIccaOnama\ 7.maanya: sa mao 8.sa %vaM madIyaona 9.AqaanQakarma\

UNIT III

I.p`QaanaSlaaoka: -

1.ekatp~ma\ 2.BaUtanaukmpa 3.AqaOkQaonaao: 4.td\ rxa 5.etavadu@%vaa 6.inaSamya dovaanaucarsya 7.xatai%kla 8.kqaM nau Sa@ya: 9.saoyaM svadohap-Na

UNIT IV

I.p`QaanaSlaaoka: -

1.BavaanapIdma\ 2.ikmaPyaihMsya: 3.sambanQamaaBaaYaNapUva-ma\ 4.tqaoit gaamau>vato 5.tismana\ xaNao 6.]i<aYz va%saoit 7.tM ivaismatM QaonauÉvaaca 8.Ba@%yaa gauraO 9.tt: samaanaIya

UNIT V

I.p`QaanaSlaaoka: -

1.santanakamaaya 2.va%sasya 3.[%qaM ixatISaona 4.sa naindnaIstnyama\ 5.p`atya-qaao>va`tparNaanto 6.p`dixaNaIkR%ya 7.tmaaihtaO%sau@ya 8.purndrEaI: 9.Aqa nayanasamau%qama\

II.kailadasasya pircaya:

CO59T027-INDIAN CULTURE - IV

(Syllabus for Fifth Semester B.E.)

Part I

Unit I – Temple worship – Evolution of religious establishments; worship in temples; ritual requirements; daily rituals; symbolism of rituals.

Unit II – Temple Festivals – Daily, monthly, yearly, occasionally, etc.; different *vahanas;mudras* in worship; *yajna* and *yajna vedicas* for different sacrifices; other worships and programs related to religious and human welfare.

Part II

Unit III – Significance of Gandharva veda; Evolution & development of music; Karnataka & Hindustani music; main styles; different famous personalities & their contribution. different early musical instruments.

Unit IV – Evolution & development of dance; different schools; important famous personalities.

Unit V – Different schools and contribution of music, dance and dramas to preserve cultural heritage.

Reference Books

Rao, S.R.K. 1992. *Alaya and Aradhana*. Agama-Kosha (Agama Encyclopaedia). Kalpatharu Research Academy Publications. Vol VI. Banglore.

Sharma, S. 1997. *Comparative study of Evolution of Music in India and the West*. Pratibha Prakashan. Delhi.

Sanyal, R. 1987. *Philosophy of Music*. Somaya Publications Pvt. Ltd. Bombay.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **V** Sub. Code: **EBL5BP101** Credit: **4**

(For students admitted from 2010 onwards)

Subject: **MICROPROCESSOR & MICRO CONTROLLER LAB I**

8085 programs

1. Programs using data transfer and processing instructions
2. Programs using interrupt instructions.
3. Programs involving subroutine & Delay.
4. Table processing algorithms.
5. Sorting and Searching algorithms.

8051 Interfacing

6. Interfacing PPI IC8255
7. Interfacing Stepper motor
8. Interfacing ADC
9. Interfacing DAC and Waveform Generation
10. Serial communication
11. Study of Interrupts

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **V** Sub. Code: **EBL5BP082** Credit: **4**

(For students admitted from 2010 onwards)

Subject: COMMUNICATION LAB

1. Measurement of OP-AMP parameters.
2. Instrumentation Amplifier.
3. D/A and A/D converters
4. Logic Analyzer Measurements
5. Signal Power measurements
6. Frequency Counters
7. Frequency Synthesizer using PLL
8. Class C Amplifier [AM Modulator]
9. FM modulator.
10. AM Demodulator
11. FM Detector
12. Pre Emphasis, De emphasis Circuits

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **VI** Sub. Code: **EBL6FT101** Credit: 3

(For students admitted from 2010 onwards)

Subject: PROBABILITY THEORY AND STOCHASTIC PROCESSES

UNIT I Probability Theory

Discrete distributions:- Binomial, Poisson, Geometric, Negative Binomial Continuous distributions: - Normal,, Gamma and Exponential distributions

UNIT II: Stochastic Processes

Introduction- Stationary processes-Martingales-Markov chains- Classification of states and chains- Determination of higher transition probabilities- Stability of a Markov system.

UNIT III Poisson processes

Introduction- Generalisation – Birth and death process- Continuous time Markov chains – Randomization – Erlang processes.

UNIT IV : Brownian motion and Renewal processes

Introduction- Wiener process – Kolmogorov equations – Time distribution – Ornstein-Uhlenbeck process, Renewal process in continuous time - Renewal Equation

UNIT V : Stationary processes and Time series

Introduction – Models of time series – power spectrum – statistical analysis of time series. M/M/1 queuing system in steady state

Text Book:

1. Gupta S.C and Kapoor.V.K , "**Fundamental of Mathematical Statistics",** S.Chand and Company, New Delhi (1999). **(For UNIT I)**
2. J.Medhi, **"Stochastic processes",** Wiley Eastern Limited, New Delhi, 1994. **(UNITS II – V)**

References :

1. Peebles P.Z.Jr, "**Probability, Random Variables and Random Signal Principles (Fourth ed)"**, Tata Mc.Graw Hill publications, New Delhi .(2002)
2. T. Veerarajan, "**Probability, Statistics and Random Processes (Second ed)**" – Tata-McGraw Hill Publication, New Delhi. (2006)

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **VI** Sub. Code: **EBL6BT082** Credit – **4**

(For students admitted from 2010 onwards)

Subject: MICROWAVE ENGINEERING

UNIT I (12 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 (12 Hrs)

Passive Devices

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

UNIT III (12 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 (12 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 (12 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 and Communication

Course: **BE** Branch: **ECE** Semester: **VI** Sub. Code: **EBL6BT103** Credits - **4**

(For students admitted from 2010 onwards)

Subject: OPTICAL COMMUNICATION

UNIT-I (12 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 (12 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 (12 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 (12 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 (12 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.

Fibre to the Home, Passive optic networks – EPON,GPON.

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 and Communication

Course: **BE** Branch: **ECE** Semester: **VI** Sub. Code: **EBL6BT104** Credit: **4**

(For students admitted from 2010 onwards)

Subject: COMPUTER ARCHITECTURE

Pre - requisite: Basics of computers, microprocessors.

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

UNIT – I [12 Hrs]

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 [12 Hrs]

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 [12 Hrs]

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 [12 Hrs]

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 [12 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** Branch: **ECE** Semester: **VI** **Sub. Code:** EBL6BT105 **Credit –** 4

(For students admitted from 2010 onwards)

Subject: COMMUNICATION NETWORKS

UNIT - I (12 Hrs)

Network and Layered Architecture:

Data Communication Networks : Introduction to PSTN, LAN, PSDN, 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 (12 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 (12 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 (12 Hrs)

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 (12 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
Traffic Engineering: Network Traffic Load & Parameters, Grade of Service, Blocking Probability.

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
3. Telecommunication Switching Systems & Networks by Thiagarajan Viswanathan. PHI

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** Branch: **ECE** Semester: **VI** **Sub. Code:** EBL6BT086 **Credit:** 4

(For students admitted from 2010 onwards)

Subject: ANTENNA & 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 [12 HRS]

Radiation: Retarded potentials, Radiation from and 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 [12 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 [12 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 [12 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 [12 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. Antenna and Wave Propagation by K.D. Prasad, Satya Prakasam, New Delhi
2. F.E. Terman: *Electronic and Radio Engineering*, McGraw Hill, 1984.
3. Rajeswari Chatterjee: *Antenna Theory and Practice*, Wiley Eastern Ltd. 1988.
4. Robert E. Collin: *Antennas and Radio Wave propagation*, McGraw Hill, 1985.

Department of Electronics and Communication

Course**: BE** Branch**: ECE** Semester: **VI** Sub. Code: **EBU6JT057** **Credit - 1**

(For students admitted from 2010 onwards)

Subject: SANSKRIT AND INDIAN CULTURE

C069T027 - SANSKRIT

Unit I

A.?gvaod: B.yajauvao-d: C.saamavaod:& Aqava-vaod:

Unit II

A.YaD=\gaaina B.]pinaYad: C.dSa-naaina

Unit III

A.puraNaaina B.[ithasa: C.stao~aiNa

Unit IV

A.kailadasa: B.Baasa: C.kaOiTlya:

Unit V

A.Sa=\kracaaya-: B.ramaanaujaacaaya-: C.maQvaacaaya-:

CO69T027-INDIAN CULTURE - V

(Syllabus for Sixth Semester B.E.)

Part I

Unit I – Art forms as cultural expression; technology & aesthetics; their relation to the social tructure.

Unit II – Evolution of religious structures & architecture in Indian; different early schools and art centers; important other secular structures.

Unit III – Development of regional styles in Indian art & architecture; important features of Nagara, Dravida & Vesara styles in temple architecture. Sculpture, Iconography and Paintings – different centers and contribution on Indian culture.

Part II

Unit IV – Significance of Stapatya veda; Silpa and Vastu Sastra – significance of vastu in architecture. Vishvakarma, Mayamata, Manasara, Samarangana, Stapatya, etc., personalities and their contribution in Indian Architecture.

Unit V – the decorative art & craft; precious stones & metal; textiles & carpets; calligraphy & other important works;

Reference Books

1.Banerji, J.N. 1941.*The Development of Hindu Iconography*. University of Calcutta. Calcutta.

2.Gopinath Rao, T.R. 1914. *Elements of Hindu Iconography*. Vol I & II.

3.Meister, M.W. (ed) 1983. *Encyclopaedia of Indian Temple Architecture.* American Indstitute of Indian Studies. University of Pennsylvania Press. Philadelphia.

4.Sukla, D.N. 1993. *Vastu-Sastra. Hindu Science of Architecture*. Munshiram Manoharlal Publishers Pvt. Ltd. New Delhi.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **VI** Sub. Code: **EBL6BP081** Credit: **4**

(For students admitted from 2010 onwards)

Subject: MICROWAVE AND OPTICS LAB

1. Frequency, Wavelength measurement.
2. VSWR (Low and High) measurements.
3. Impedance measurements.
4. Antenna measurements - directivity and gain.
5. Insertion loss measurements
6. Reflex klystron - mode characteristics.
7. Gunn diode characteristics.
8. Determination of Numerical aperture and Fiber Losses.
9. Diode detector characteristics
10. Measurement of EM waves in coaxial cables
11. Isolator/Circulator Characteristics
12. Magic TEE

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **VI** **Sub. Code:** EBL6BP102 **Credit:** 4

(For students admitted from 2010 onwards)

Subject: MICRO PROCESSOR AND MICRO CONTROLLER LAB II

8086 Based Programs

1. Arithmetic Operations.
2. Data Transfer Operations.
3. String Operations.

ADSP 2181 Processor Based Programs

1. Arithmetic Operations.
2. Circular Addressing.
3. Waveform Generation.

ARM Based Programs

1. Lighting up of LEDs.
2. LCD Interfacing.
3. Serial Interfacing.
4. Sensor Interfacing.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **VII** **Sub. Code:** EBL7BT081 **Credit:** 4

(For students admitted from 2010 onwards)

Subject: DIGITAL COMMUNICATION

Pre - requisite: Signals and Systems, Digital Electronics.

Objectives: To Design digital communication links for terrestrial, line, satellite, computer systems.

UNIT – I [12 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., Practical Communication system in the light of Shanon's equation.

UNIT – II [12 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 [12 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 [12 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 [12 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. Comparison of error rates in coded and uncoded Transmission).

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** Branch: **ECE** Semester: **VII** Sub. Code: **EBL7BT102** Credit - **4**

(For students admitted from 2010 onwards)

Subject: CELLULAR MOBILE COMMUNICATIONS

UNIT - I: INTRODUCTION TO CELLULAR CONCEPTS **8 Hours**

Evolution of mobile radio communications. Examples of mobile radio systems. System design fundamentals, frequency reuse, hand-off strategies, interference. Paging systems: on-site paging, wide area paging, signaling methods, POCSAG, transmitters and receivers, propagation system architectures, paging terminal, Digital european cordless telephone (DECT).

UNIT - II: CELLULAR RADIO DESIGN PRINCIPLES **8 Hours**

The Cellular principle radio coverage by single cell. Multiple cell plan. The fixed supporting network Hand over. Analog cellular frequency allocation plans. Base station site engineering. Concepts and benefits of channel sharing.

UNIT - III: MOBILE RADIO PROPAGATION **8 Hours**

Introduction, free space propagation model. The three basic propagation mechanisms; reflection, diffraction and scattering. Practical propagation models; long - distance path loss models, outdoor propagation models, small scale fading: flat fading and frequency selective fading.

UNIT - IV: CO-CHANNEL INTERFERENCE REDUCTION **8 Hours**

Exploring Co-channel interference areas in a system, real time Co-channel interference measurements, omni directional and directional antenna designs for interference reduction. Power control, diversity techniques. Types of non-Cochannel interference and their reduction.

UNIT - V: DIGITAL CELLULAR SYSTEMS **8 Hours**

Second-generation systems. Time division multiple access. Possible advantages of TDMA European Cellular system. Features of GSM, The OSI reference model fixed network supporting GSM, the radio part, timing structure of GSM, channel coding and training sequence, radio link management, signaling within GSM. The north american digital cellular system: capacity of cellular CDMA ,CDMA power control, CDMA digital cellular standard (IS_95). Current topics: Personal access communication. Systems using infrared Wireless LAN, wireless ATM, intelligent network concepts in mobile communications, UMTS and wireless multimedia.

TEXT BOOK:

1. Johen Schiller, “Mobile Communication”, Addison Wesley,

REFERENCE BOOKS:

1. R.C.V Macario, “Cellular Radio”, Macmillan.

2. C.Y.Lee, “Mobile Cellular Telecommunications”, (2/E), Mcgraw Hill.

3. Raj Pandya, “Mobile And Personnel Communication System”, PHI. 2000.

4. J.D.Gibson, “The Mobile Communications Handbook”, IEEE Press.

5. T.S Rappaport, “Wireless Communications Principles”, P.H

6. Parsons and Gardiner, “Mobile Communication Systems”, Halsted Press. 2000

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **VII** Sub. Code**: EBL7BT083** Credit - **4**

(For students admitted from 2010 onwards)

Subject: BROADCASTING & TELECASTING SYSTEMS

UNIT- I (12 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 Iamge Scanners (The CCD).

UNIT –II (12 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 (12 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 (12 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 (12 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..

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** Branch**: ECE** Semester: **VII** **Sub. Code:** EBL7BT084 **Credits:** 4

(For students admitted from 2010 onwards)

Subject: COMPUTER AIDED SYSTEM DESIGN

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 [12 HRS]

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 [12 HRS]

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 [12 HRS]

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 [12 HRS]

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 [12 HRS]

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** Branch: **ECE** Semester: **VII** Sub. Code: **EBL7BP081** Credit: **4**

(For students admitted from 2010 onwards)

Subject: DIGITAL COMMUNICATION LAB

1. Study of sampling theorem
2. Pulse amplitude modulation and demodulation
3. Pulse width modulation and demodulation
4. Pulse code modulation and demodulation
5. Pulse position modulation and demodulation
6. Time division multiplexing and demultiplexing
7. Study of amplitude shift keying system
8. Study of frequency shift keying system
9. Manchester coding and decoding
10. FIR filter using DSP
11. IIR filter using DSP

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **VII** Sub. Code: **EBL7BP082** Credit: **4**

(For students admitted from 2010 onwards)

Subject: COMPUTER AIDED SYSTEM DESIGN LAB

PSPICE :

1. RC Circuits – Timing Analysis and Frequency Response.
2. Inverting and Non-Inverting Amplifiers using OPAMPS-Timing Analysis and Frequency Response.
3. Implementation of Combinational circuits – A 4:1 Multiplexer.
4. Implementation of Sequential Circuits –Flip-Flops and Counters.

HDL(Simulation and Implementation):

1. Implementation of Basic Digital Gates.
2. Implementation of Full Adder and Full-Subtractor
3. Implementation of 4-bit Adder
4. Implementation of Multiplexer and De-Multiplexer
5. Implementation of Flip-Flops, and Counters.

MATLAB:

1. Study of Matlab Commands
2. Waveform Generation.
3. Linear & Circular Convolution
4. DFT & FFT
5. IIR & FIR Filter Design.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Semester: **VII** Sub. Code**: EBL8BT081** Credits: **4**

(For students admitted from 2010 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 [12 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 [12 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 [12 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 [12 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 [12 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

LIST OF ELECTIVE SUBJECTS

Course: **BE** Branch: **ECE** **Sub. Code:** EBL7BE085A **Credit -** 4

(For students admitted from 2010 onwards)

Subject: **ROBOTICS** [ELECTIVE]

Pre - requisite: Control systems.

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

UNIT –I [12 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 [12 Hrs]

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

UNIT – III [12 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 [12 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 [12 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** Branch**: ECE** Sub. Code: **EBL7BE085B** Credit - **4**

(For students admitted from 2010 onwards)

Subject : SPEECH SIGNAL PROCESSING [ELECTIVE]

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

UNIT – I [12Hrs]

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 [12Hrs]

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

UNIT – III [12Hrs]

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 [12Hrs]

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

UNIT – V [12Hrs]

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** Branch: **ECE** Sub. Code: **EBL7BE105C** Credit: **4**

(For students admitted from 2010 onwards)

Subject: TELECOMMUNICATION SWITCHING SYSTEMS [ELECTIVE]

UNIT I MULTIPLEXING

Transmission Systems, FDM Multiplexing and modulation, Time Division Multiplexing, Digital Transmission and Multiplexing: Pulse Transmission, Line Coding, Binary N-Zero Substitution, Digital Biphase, Differential Encoding, Time Division Multiplexing, Time Division Multiplex Loops and Rings. SONET/SDH: SONET Multiplexing Overview, SONET Frame Formats, SONET Operations, Administration and Maintenance, Payload Framing and Frequency Justification, Virtual Tributaries, DS3 Payload Mapping, E4 Payload Mapping, SONET Optical Standards, SONET Networks. SONET Rings: Unidirectional Path-Switched Ring, Bidirectional Line-Switched Ring.

UNIT II DIGITAL SWITCHING

Switching Functions, Space Division Switching, Time Division Switching, two-dimensional Switching: STS Switching, TST Switching, No.4 ESS Toll Switch, Digital Cross-Connect Systems, Digital Switching in an Analog Environment. Elements of SSN07 signaling.

UNIT III NETWORK SYNCHRONIZATION CONTROL AND MANAGEMENT

Timing: Timing Recovery: Phase-Locked Loop, Clock Instability, Jitter Measurements, Systematic Jitter. Timing Inaccuracies: Slips, Asynchronous Multiplexing, Network Synchronization, U.S. Network Synchronization, Network Control, Network Management.

UNIT IV DIGITAL SUBSCRIBER ACCESS

ISDN: ISDN Basic Rate Access Architecture, ISDN U Interface, ISDN D Channel Protocol. High-Data-Rate Digital Subscriber Loops: Asymmetric Digital Subscriber Line
, VDSL. Digital Loop Carrier Systems: Universal Digital Loop Carrier Systems, Integrated Digital Loop Carrier Systems, Next-Generation Digital Loop Carrier, Fiber in the Loop, Hybrid Fiber Coax Systems, Voice band Modems: PCM Modems , Local Microwave Distribution Service, Digital Satellite Services.

UNIT V TELECOMMUNICATIONS SIGNALLING

Introduction - Customer line signalling - Audio-frequency junction and trunk circuits - FDM carrier systems - PCM signalling - Inter-register signalling - Common-channel signalling principles - CCITT signalling system no.6 - CCITT signalling system no.7-Digital customer line signalling.

TEXTBOOK

1. Bellamy John, "Digital Telephony", John Wily & Sons, Inc. 3rd edn. 2000
2. Telecommunications Switching, Traffic and Networks, J.E.Flood, Pearson Education- 2006.

REFERENCES

1. Telecommunication Switching Systems and Networks, Thiagarajan Viswanathan, Prentice Hall of India Pvt. Ltd, 2007.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Sub. Code: **EBL7BE105D** Credit: **4**

(For students admitted from 2010 onwards)

Subject: POWER ELECTRONICS

UNIT I: POWER SEMICONDUCTOR DEVICES

Power diodes – power transistor – characteristics of SCR, Triac, power MOSFET – IGBT – MCT – LASCR – SCR turn on, turn off characteristics – thyristor specifications – thyristor protection circuits.Thyristor trigger circuits

UNIT II: CONVERTERS AND INVERTERS

Natural commutation – single phase – three phase – half controlled and fully controlled rectifiers – effect of source and load inductance –Voltage source inverters – series, parallel and bridge inverters – current source inverters – PWM inverters – DC chopper – AC chopper

UNIT III: TYPICAL APPLICATION

Control of DC and AC drives – stepper and switched reluctance motor drive – AC voltage regulators – SMPS – uninterrupted power supply – induction heating.

UNIT IV: DC DRIVES

Speed control of DC motors – Thyristor converter fed DC drives : Single, two and four quadrant operations. Introduction - Chopper Drives.

UNIT V:THREE – PHASE INDUCTION MOTOR DRIVES

Speed control of Induction motors – Stator control – stator voltage and frequency control, AC chopper, Inverter cycloconverter fed induction motor drives. Introduction - Synchronous Motor drives

TEXT BOOKS

1. P.S.Bimbhra, *Power Electronics*, Khanna Publishers, New Delhi, 2002
2. Dubey G.K. and Kasara .Bada Rao., *Power Electronic and Drives*, Narosa Publications, 1986.

REFERENCES

1. G.K.Dubey, Doradia, S.R. Joshi and R.M.Sinha, Thyristorised, *Power Controllers*, New Age International Publishers, New Delhi, 1996.
2. M.H.Rashid, *Power Electronics – circuits, devices and applications*, PHI, New Delhi, 1995.
3. P.C.Sen, *Modern Power Electronics*, Wheeler Publishers, New Delhi, 1998.
4. Vedam Subramaniyam, *Electric Drives*, Tata McGraw Hill Ltd,1994.

Department of Electronics and Communication

Course **: BE** Branch: **ECE** Sub. Code: **EBL7BE086A** Credit - **4**

(For students admitted from 2010 onwards)

Subject: 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** Branch: **ECE** **Sub. Code:** EBL7BE106B **Credit -** 4

(For students admitted from 2010 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 [9HRS] 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]

ARM PROCESSORS

The ARM architecture – ARM assembly language program – ARM organization and implementation – The ARM instruction set - The thumb instruction set – ARM CPU cores(ARM 7 and ARM9)

TEXTBOOKS :

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint Oct. 2003
2. Steve Furber, '' ARM System –On –Chip architecture "Addison Wesley, 2000.

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

.Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware /Software Introduction, John Wiley, 2002

Department of Electronics and Communication

Course: **BE** Branch: **ECE** **Sub. Code:** EBL7BE086C **Credit -** 4

(For students admitted from 2010 onwards)

Subject: DIGITAL IMAGE PROCESSING [ELECTIVE]

Pre - requisite: Matrix Algebra.

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

UNIT I [12Hrs]

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

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

UNIT II[12 Hrs]

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

UNIT III [12 Hrs]

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 [12 Hrs]

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

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

UNIT V [12 Hrs]

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:

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

REFERENCE BOOKS:

Anil K. Jain, “Fundamentals of Digital Image Processing”, Prentice Hall, 1987.

A. Rosenfeld, A.C. Kak, “Digital Image Processing”, Academic Press, 1979.

William K. Pratt, “Digital Image Processing”, John Wiley and sons, 1978.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Sub. Code: **EBL7BE106D** Credit: **4**

(For students admitted from 2010 onwards)

Subject: PROCESS CONTROL INSTRUMENTATION

UNIT I :MATHEMATICAL MODELLING OF PROCESSES

Need for process control – Mathematical model of first order liquid level and thermal processes – Higher order process – Process with dead time, process with inverse response – Interacting and non-interacting systems – Continuous and batch process – Servo and regulator operation.

UNIT II : CONTROLLER CHARACTERISTICS & TUNING

Basic control action – Characteristics of ON-OFF, proportional, integral and derivative control modes – Composite control modes – P+I, P+D and P+I+D control modes – Electronic controllers to realize various control actions – Evaluation criteria – IAE, ISE, ITAE and ¼ decay ratio – Tuning of controllers – Ziegler-Nichol's method and cohencoon method – Damped oscillation method.

UNIT III :CONTROL SYSTEMS WITH MULTIPLE LOOPS

Cascade control – Feed forward control – Ratio control – Selective control systems – Split range control – Adaptive and inferential control.

UNIT IV: FUZZY LOGIC CONTROL SYSTEM

Fuzzy logic controller - fuzzification interface - knowledge base- - decision making logic - defuzzification interface - design of fuzzy logic controller case study.

UNIT V :FINAL CONTROL ELEMENT

I/P converter – Pneumatic and electric actuators – Valve positioner – Control valves characteristics – Classification of control valves – Control valve sizing – Cavitations and flashing – Selection of control valves.

TEXT BOOKS

1. Donald P. Eckman, 'Automatic Process Control', Wiley Eastern Ltd., New Delhi, 1993.
2. G.Stephanopoulis, 'Chemical Process Control', Prentice Hall of India, New Delhi, 1990.
3. Klir G.J., and Yuan B.B., Fuzzy sets and fuzzy logic, Prentice Hall of India, New Delhi, 1997.

REFERENCE BOOKS

1. B.G.Liptak, 'Process Control', Chilton Book Company, 1994.
2. Curtis D. Johnson, 'Process Control Instrumentation Technology', 7th Edition, Pearson Education, New Delhi, 2002 / PHI.
3. J.G.Balchen and K.J.Mumme, 'Process Control structures and Application', Van nostrand Reinhold Co., New York, 1988.

Department of Electronics and Communication

Course**: BE** Branch: **ECE** Sub. Code: **EBL8BE082A** Credit - **4**

(For students admitted from 2010onwards)

Subject:**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 [12Hrs]

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 [12Hrs]

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

UNIT III [12Hrs]

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 [12Hrs]

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

UNIT V [12Hrs]

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.

4.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** Sub. Code: **EBL8BE102B** Credit: **4**

(For students admitted from 2010 onwards)

Subject: WIRELESS COMMUNICATION SYSTEMS

UNIT I

Cellular Concept –systems Design Fundamentals : Frequency Reuse - Channel Assignment & Handoff Strategies – Interference and System Capacity – Trunking and Grade of Service – Improving Coverage & Capacity in Cellular Systems – Radio Wave Propagation – Free Space Propagation Model – Basic Propagation Mechanisms – reflection – Ground Reflection Model – Diffraction – Scattering – Practical link budget design – Outdoor and Indoor Propagation Models – Signal penetration into buildings – Ray Tracing and site specific Modeling. Wi-Fi and WiMax

UNIT II

Mobile Radio Propagation - Small-Scale fading and multipath : Small scale multipath Propagation – Impulse response model of a multipath channel–parameters of mobile multipath channels – Types of small scale fading – statistical for multipath channels – Multipath shape factors for small scale fading wireless channels.

UNIT III

Error Control Coding : Linear Block Codes – Cyclic Codes – Optimum soft Decision decoding – Hard Decision decoding – Bounds on minimum distance – Non-binary, concatenated Block Codes – Interleaving of coded data for channels with burst errors – Serial and Parallel concatenated block codes – Convolutional codes:

Transfer Function – Viterbit Algorithm – Soft decision & hard decision decoding – Distance Properties –Punctured Convolutional codes – Non-binary Dual-K codes and Concatenated codes – Trellis coded Modulation.

UNIT IV

Modulation technique for mobile radio : Amplitude modulation – Angle modulation – Digital modulation –Line Coding – Pulse Shaping techniques – Geometric representation of modulation signals – Linear modulation techniques – Constant envelope modulation – combined linear and constant modulation techniques – Spread spectrum modulation – Modulation Performance in fading and multipath channels.

UNIT V

Equalization, Diversity, Multiple Access Techniques : Fundamentals of Equalization – Training a generic adaptive equalizer – Equalizers in communication receiver – Linear Equalizer Non-linear Equalization –Algorithm for adaptive equalization – Fractional Equalizer – Diversity Techniques – RAKE receiver –Interleaving, Frequency Division Multiple Access (FDMA) Spread Spectrum Multiple Access – Space Division Multiple Access(SDMA) – Packet Radio.

Text Books:

1. Theodore S. Rappaport, "Wireless Communications", Pearson Education, 2002.

2. John G. Proakis, "Digital Communications", Fourth Ed. McGraw Hill International Edition, 2000.

References:

1. Simon Haykin "Communication Systems" , 3rd Edition, John Wiley, 2002.

2. Edward Lee and David Messerschmitt, "Digital Communication", Kluwer Academic Publications,1993.

Department of Electronics and Communication

Course **: BE** Branch: **ECE** Sub. Code: EBL8BE082C Credit - 4

(For students admitted from 2010 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** Branch: **ECE** **Sub. Code:** EBL8BE082D **Credit -** 4

(For students admitted from 2010 onwards)

Subject: RADAR AND NAVIGATIONAL AIDS [ELECTIVE]

Pre - requisite: Communication systems, mathematics.

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

UNIT – I [12Hrs]

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 frequuency and range ambiquities, system losses and propagation effects.

UNIT – II [12Hrs]

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 [12Hrs]

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

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

UNIT – IV [12Hrs]

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

UNIT – V [12Hrs]

Electronic navigation: Adhock diection finder, ADF, VHF omnidirectional.
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** Branch: **ECE** Sub. Code: EBL8BE083A **Credit -** 4

(For students admitted from 2010 onwards)

Subject: CODING THEORY AND CRYPTOGRAPHY [ELECTIVE]

Pre - requisite: Engineering Mathematics, Digital Electronics.

Objectives: Information Security and error free communication (research).

UNIT – I [12 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 [12 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 [12 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 [12 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 [12 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** Branch: **ECE** **Sub. Code:** EBL8BE083B **Credit -** 4

(For students admitted from 2010 onwards)

Subject: NEURAL NETWORKS AND FUZZY LOGIC [ELECTIVE]

Pre - requisite: Engineering Mathematics.

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

UNIT – I [12 Hrs]

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 [12 Hrs]

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 [12 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 [12 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 [12 Hrs]

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.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** **Sub. Code:** EBL8BE083C **Credit -** 4

(For students admitted from 2010 onwards)

Subject: PRINCIPLES OF NANO TECHNOLOGY [ELECTIVE]

UNIT I INTRODUCTION

Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II PREPARATION METHODS

Bottom-up Synthesis-Top-down Approach: Precipitation, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III PATTERNING AND LITHOGRAPHY FOR NANOSCALE DEVICES

Introduction to optical/UV electron beam and X-ray Lithography systems and processes, Wet etching, dry (Plasma /reactive ion) etching, Etch resists-dip pen lithography.Clean rooms: specifications and design, air and water purity, requirements for particular processes,

UNIT IV APPLICATIONS IN ELECTRONIC DEVICES

Carbon nano tube electronics, band structure & transport, devices applications.

UNIT V CHARECTERISATION TECHNIQUES

X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation

TEXT BOOKS:

1. A.S. Edelstein and R.C. Cammearata, eds., "Nanomaterials: Synthesis, Properties and Applications", Institute of Physics Publishing, Bristol and Philadelphia, 1996.
2. C.P.Poole Jr., F.J.Owens," Introduction to Nano technology", Wiley 2003 (UNIT IV)
3. N John Dinardo, "Nanoscale charecterisation of surfaces & Interfaces", 2nd Edition, Weinheim Cambridge, Wiley-VCH, 2000

REFERENCES:

1. G Timp (Editor), "Nanotechnology", AIP press/Springer, 1999
2. Akhlesh Lakhtakia (Editor), "The Hand Book of Nano Technology,Nanometer Structure", Theory, Modeling and Simulations", Prentice-Hall of India (P) Ltd, New Delhi, 2007.

Department of Electronics and Communication

Course: **BE** Branch: **ECE** **Sub. Code:** EBL8BE103D **Credit -** 4

(For students admitted from 2010 onwards)

Subject: **SATELLITE COMMUNICATION AND BROADCASTING[**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 [12 HRS]

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 [12 HRS]

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 [12 HRS]

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 [12 HRS]

EARTH SEGMENT:

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

UNIT – V [12 HRS]

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, DTH and Plasma/ LCD TVs

TEXT BOOK:

1. Debnis Roddy : "Satellite Communications", Mc Graw Hill, III Edn, 2001
2. 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