REGULATIONS – 2011

DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING

CURRICULUM AND SYLLABI OF
B.E.- ELECTRONICS AND COMMUNICATION ENGINEERING
REGULATIONS 2011
CURRICULUM AND SYLLABI FOR FULL TIME
B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER – I
Common to all B.E. / B.Tech. Degree Programmes

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**PRACTICAL**

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- * Common to all B.E. / B.Tech. Programmes
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### SEMESTER – VIII

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### SEVENTH SEMESTER ELECTIVES (ELECTIVE III & IV)

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### EIGHTH SEMESTER ELECTIVES (ELECTIVE V & VI)

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BEG101    TECHNICAL ENGLISH – I   L T P C
3 1 0 4

UNIT I

Suggested activities:
2. Changing sentences from active to passive voice & vice versa.
3. Skimming, cloze exercises, exercises transferring information from text to graphic form – bar charts, flow charts.
4. Writing descriptions using descriptive words & phrases, and technical vocabulary.
5. Role play, conversation exercises, discussions, oral reporting exercises.
Any other related relevant classroom activity.

UNIT II

Suggested Activities:
1. a. Vocabulary activities using prefixes and suffixes.
   b. Exercises using questions – asking & answering questions.
2. Scanning the text for specific information.
4. Discussion activities and exploring creative ideas.
Any other related relevant classroom activity.

UNIT III

Suggested activities:
1. Providing appropriate context for the use of tenses
2. Listening and note-taking
3. (a) Writing sentence definitions and instructions
   (b) Identifying the discourse links and sequencing jumbled sentences.
4. Speaking exercises, discussions, role play exercises using explaining, convincing and persuasive Strategies.
Any other related relevant classroom activity.

UNIT IV
Modal verbs and Probability – Concord subject verb agreement (Correction of errors) – Cause and effect expressions – Extended Definition – Speaking about the future plans.
Suggested activities:
1. a. Making sentences using modal verbs to express probability
   b. Gap filling using relevant grammatical form of words.
2. Writing extended definitions
3. Speaking – role play activities, discussions, extempore speaking exercises speculating
   about the future.
   Any other related relevant classroom activity

UNIT V
‘If’ conditionals – Gerunds – Intensive reading – Speaking – Presentation of problems & solutions –
Itinerary – planning for an industrial visit – Formal Letter writing – Letter to the editor, invitation
letter, accepting, declining letter and permission letter.

Suggested activities:
1. a) Sentence completion exercises using ‘If’ conditionals.
   b) Gap filling exercises using gerunds and present participle forms
2. Reading comprehension exercises.
3. Role play, discussion, debating and speaking activities for stating, discussing problems and
   suggesting solutions.
4. Writing letters to officials and to the editor in formal/official contexts.
   Any other related relevant classroom activity.

TOTAL: 60 PERIODS

AREAS TO BE COVERED UNDER DIFFERENT HEADINGS:

A) Language focus
1. Suffixes and Prefixes
2. Transformation of words from one form to another (Derivatives from root words)
3. Matching words & meanings (synonyms)
4. Compound nouns
5. Degrees of comparison
6. Active and passive voice-impersonal passive
7. Tenses: simple present, simple past, simple future, present continuous, past
   continuous, Present Perfect.
8. Modal verbs
9. ‘Wh’ Question forms
10. Conditional clause
11. Gerunds and infinitives
12. Expressing Cause and effect
13. Concord
14. Punctuation
15. Writing definitions

B) Reading
1. Reading in context
2. Skimming and scanning
3. Scanning the text for specific information
4. Reading and note-making
5. Intensive reading for making inferences
6. Reading comprehension
C) Listening:

1. Listening and transfer of information
2. Listening & note taking

D) Writing:

1. Transformation of information from graphical data to written form and from written form to graphical form.
2. Paragraph writing – Description
3. Paragraph Writing – comparison and contrast.
4. Note-making
5. Writing Instructions
6. Jumbled sentences
7. Letter writing – Formal letters (Invitation, Accepting, Declining, Permission Letters)
   Letters to the editor

E) Speaking:

1. Discussing as a group and making oral reports,
2. Role play-Conversation techniques – convincing others
3. Creative thinking and speaking, Exploring creative ideas
4. Persuasive strategies
5. Speaking about the future plans
6. Extempore speech – Speaking exercises speculating about the future
7. Presentation of problems and solutions
8. Debates

TEXT BOOK:


REFERENCES:


Extensive Reading:

BMA101 MATHEMATICS – I L T P C
3 1 0 4

UNIT I MATRICES 12

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY 12

UNIT III DIFFERENTIAL CALCULUS 12
Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes – Evolute as envelope of normals.

UNIT IV FUNCTIONS OF SEVERAL VARIABLES 12

UNIT V MULTIPLE INTEGRALS 12
Double integration – Cartesian and polar coordinates – Change of order of integration – Change of variables between Cartesian and polar coordinates – Triple integration in Cartesian co-ordinates – Area as double integral – Volume as triple integral.

TOTAL: 60 PERIODS

TEXT BOOK:

REFERENCES:
BPH101 ENGINEERING PHYSICS – I  

UNIT I  ULTRASONICS  

UNIT II  LASERS  

UNIT III  FIBER OPTICS & APPLICATIONS  

UNIT IV  QUANTUM PHYSICS  

UNIT V  CRYSTAL PHYSICS  
Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – NaCl, ZnS, diamond and graphite structures – Polymorphism and allotropy – Crystal defects – point, line and surface defects – Burger vector.

TEXT BOOKS:

TOTAL: 45 PERIODS
REFERENCES:
UNIT I  WATER TECHNOLOGY  

UNIT II  POLYMERS AND COMPOSITES  

UNIT III  SURFACE CHEMISTRY  

UNIT IV  NON-CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES  

UNIT V  ENGINEERING MATERIALS  

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
BCS101  FUNDAMENTALS OF COMPUTING AND PROGRAMMING  L T P C
3 0 0 3

UNIT I  INTRODUCTION TO COMPUTERS
9
Classification of Computers – Basic Computer Organization – Number Systems.

UNIT II  COMPUTER SOFTWARE
9
Computer Software – Types of Software – Software Development Steps – Internet Evolution – Basic
Internet Terminology – Getting connected to Internet – Applications.

UNIT III  PROBLEM SOLVING AND OFFICE AUTOMATION
9
Planning the Computer Program – Purpose – Algorithm – Flow Charts – Pseudocode – Application
Software Packages – Introduction to Office Packages (not detailed commands for examination).

UNIT IV  INTRODUCTION TO “C”
9
Overview of “C” – Constants, Variables and Data Types – Operators and Expressions – Managing
Input and Output operators – Decision Making – Branching and Looping.

UNIT V  FUNCTIONS AND POINTERS
9
Handling of Character Strings – User-defined functions – Definitions – Declarations – Call by
reference – Call by value – Structures and Unions – Pointers – Arrays – The Preprocessor –
Developing a “C” Program: Some Guidelines.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
Education Inc. (2005).
BME101   ENGINEERING GRAPHICS   L T P C
2 3 0 4

UNIT I   PLANE CURVES AND FREE HAND SKETCHING
CURVES USED IN ENGINEERING PRACTICES:
Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of
cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the
above curves.
FREE HAND SKETCHING:
Representation of Three Dimensional objects – General principles of orthographic projection – Need
for importance of multiple views and their placement – First angle projection – layout views –
Developing visualization skills through free hand sketching of multiple views from pictorial views of
objects.

UNIT II   PROJECTION OF POINTS, LINES AND PLANE SURFACES
Projection of points and straight lines located in the first quadrant – Determination of true lengths and
true inclinations – Projection of polygonal surface and circular lamina inclined to both reference
planes.

UNIT III   PROJECTION OF SOLIDS
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one
reference plane by change of position method.

UNIT IV   SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane
and perpendicular to the other – Obtaining true shape of section. Development of lateral surfaces of
simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces
of solids with cylindrical cutouts, perpendicular to the axis.

UNIT V   ISOMETRIC AND PERSPECTIVE PROJECTIONS
Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated
prisms, pyramids, cylinders and cones. Combination of any two simple solids. Perspective projection
of prisms, pyramids and cylinders by visual ray method and vanishing point method.

TOTAL: 60 PERIODS

TEXT BOOK:

REFERENCES:
6. Dhananjay A. Jolhe, “Engineering Drawing with an introduction to AutoCAD” Tata
BCS131  COMPUTER PRACTICE LABORATORY – I  L T P C  0 0 3 2

LIST OF EXERCISES
I. MS Office

a) WORD PROCESSING
   1. Document creation, Text manipulation with Scientific notations.
   2. Table creation, Table formatting and Conversion.

b) SPREAD SHEET
   1. Chart - Line, XY, Bar and Pie.
   2. Formula - formula editor.
   4. Sorting and Import / Export features.

II SIMPLE C PROGRAMMING
   1. Data types, Expression evaluation, Conditional statements.
   2. Arrays.
   4. Functions.

   TOTAL: 45 PERIODS

   For programming exercises Flow chart and pseudocode are essential.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 60 STUDENTS

HARDWARE
   • LAN System with 66 nodes (OR) Standalone PCs – 66 Nos.
   • Printers – 3 Nos.

SOFTWARE
   • OS – Windows / UNIX Clone
   • Application Package – Office suite
   • Compiler – “C”
LIST OF EXPERIMENTS
1. (a) Particle size determination using Diode Laser.
   (b) Determination of Laser parameters – Wavelength and angle of divergence.
   (c) Determination of acceptance angle in an optical fiber.
2. Determination of thickness of a thin wire – Air wedge method.
6. Determination of Hysteresis loss in a ferromagnetic material.

LIST OF EXPERIMENTS
1. Estimation of hardness of Water by EDTA method.
2. Estimation of Copper in brass by EDTA method.
3. Determination of DO in water (Winkler’s method)
4. Estimation of Chloride in Water sample (Argentometric)
5. Estimation of alkalinity of Water sample
6. Determination of molecular weight and degree of polymerization using viscometry.
BME131  ENGINEERING PRACTICES LABORATORY  

GROUP A (CIVIL & MECHANICAL)

I CIVIL ENGINEERING PRACTICE

BUILDINGS:
(a) Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

PLUMBING WORKS:
(a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
(b) Study of pipe connections requirements for pumps and turbines.
(c) Preparation of plumbing line sketches for water supply and sewage works.
(d) Hands-on-exercise:
   Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.
(e) Demonstration of plumbing requirements of high-rise buildings.

CARPENTRY USING POWER TOOLS ONLY:
(a) Study of the joints in roofs, doors, windows and furniture.
(b) Hands-on-exercise:
   Wood work, joints by sawing, planing and cutting.

II MECHANICAL ENGINEERING PRACTICE

WELDING:
(a) Preparation of arc welding of butt joints, lap joints and tee joints.
(b) Gas welding practice.

BASIC MACHINING:
(a) Simple Turning and Taper turning.
(b) Drilling Practice.

SHEET METAL WORK:
(a) Forming & Bending:
(b) Model making – Trays, funnels, etc.
(c) Different type of joints.

MACHINE ASSEMBLY PRACTICE:
(a) Study of centrifugal pump.
(b) Study of air conditioner.

DEMONSTRATION ON:
(a) Smithy operations, upsetting, swaging, setting down and bending. Example – Exercise – Production of hexagonal headed bolt.
(b) Foundry operations like mould preparation for gear and step cone pulley.
(c) Fitting – Exercises – Preparation of square fitting and vee – fitting models.
GROUP B (ELECTRICAL & ELECTRONICS)

III ELECTRICAL ENGINEERING PRACTICE
1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair-case wiring
5. Measurement of energy using single phase energy meter.

IV ELECTRONICS ENGINEERING PRACTICE
1. Study of Electronic components and equipments – Resistor colour coding, measurement of AC signal parameters (peak-peak value, rms value period, frequency) using CRO.
2. Study of logic gates AND, OR, EX-OR and NOT.
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor for HWR and FWR.

TOTAL: 45 PERIODS

REFERENCES:
BEG201  TECHNICAL ENGLISH – II  L T P C
(Common to all branches)  3 0 0 3

AIM
To encourage students to actively involve in participative learning of English and to help them acquire communication skills.

OBJECTIVES
1. To help the students to develop listening skills for academic and professional purposes.
2. To help the students to acquire the ability of effective speaking in English in real-life situations.
3. To inculcate reading habit and to develop effective reading skills.
4. To help the students to improve their active and passive vocabulary.
5. To familiarize the students with different rhetorical functions of scientific English.
6. To enable the students to write letters and reports effectively in formal and business situations.

UNIT I  10
Technical Vocabulary – meanings in context, sequencing words, Articles – Prepositions, intensive reading and predicting content, Reading and interpretation, extended definitions, process description.

Suggested activities
1. Exercises on word formation using the prefix ‘self’ – Gap filling with preposition
2. Reading comprehension exercise with questions based on inference – Reading heading and predicting the content – reading advertisements and interpretation
3. Writing extended definitions – Writing description of processes – Writing paragraphs based on discussions – Writing paragraphs describing the future

UNIT II  10

Suggested Activities
1. Reading comprehension exercises with questions on overall content – Discussions analyzing stylistic features (creative and factual description) – Reading comprehension exercises with texts including graphic communication – Exercises in interpreting non-verbal communication.
2. Listening comprehension exercises to categories data in tables.
3. Writing formal letters – quotations, placing orders, clarification, and complaint, Letter seeking permission for industrial visits, writing analytical paragraphs on different debatable issues.

UNIT III  10
Suggested Activities

1. Exercises combining sentences using cause and effect expressions – Gap filling exercises using the appropriate tense forms – Making sentences using different grammatical forms of the same word.
2. Speaking exercises involving the use of stress and intonation – Group discussions – analysis of problems and offering solutions.
3. Reading comprehension exercises with critical questions, multiple choice questions.

UNIT IV


Suggested Activities

1. Rewriting exercises using numerical adjectives.
2. Reading comprehension exercises with analytical questions on content – Evaluation of content.
3. Listening comprehension – entering information in tabular form, intensive listening exercise and completing the steps of a process.
4. Speaking – Role Play – group discussions – Activities giving oral instructions.
5. Writing descriptions, expanding hints – writing argumentative paragraphs – Writing formal letters – writing letter of application with CV/Bio-data – Writing general and safety instructions – Preparing checklists – Writing e-mail messages

UNIT V

Speaking – Discussion of problems and solutions – Creative and critical thinking – writing an essay, Writing a proposal.

Suggested Activities

1. Case Studies on problems and solutions
2. Brain storming and discussion
3. Writing Critical essays
4. Writing short proposals of 2 pages for starting a project, solving problems, etc.
5. Writing advertisements

TOTAL 45 periods

AREAS TO BE COVERED UNDER DIFFERENT HEADINGS

A. Language Focus

1. Technical vocabulary
2. Sequencing words
3. Articles
4. Prepositions
5. Word formation using prefixes
6. Phrases / Structure indicating purpose
7. Adverbs
8. Cause and effect expressions
9. Tense forms
10. Different grammatical forms of the same word
11. Numerical adjectives
12. Extended definitions

B. Reading
   1. Intensive reading and predicting content
   2. Reading and interpretation
   3. Skimming
   4. Critical reading
   5. Reading comprehension exercises

C. Listening
   1. Correlating verbal and non-verbal communication
   2. Listening comprehension

D. Speaking
   1. Group Discussions
   2. Stress and intonation
   3. Role plays and giving oral instructions
   4. Discussion of problems and solutions

E. Writing
   1. Process description
   2. Formal letter writing
   3. Writing analytical paragraphs
   4. Report Writing
   5. Descriptive writing
   6. Argumentative paragraphs
   7. Letter of application
   8. Instructions
   9. Recommendations
10. Checklists preparation
11. Email Communication
12. Writing critical essays
13. Writing proposals

TEXT BOOK:

REFERENCES:
Extensive Reading:

Note:
The book listed under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.
BMA201 MATHEMATICS – II  
(From the all branches)  L T P C  3 1 0 4

UNIT I  ORDINARY DIFFERENTIAL EQUATIONS  12
Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy’s and Legendre’s linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT II  VECTOR CALCULUS  12
Gradient Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green’s theorem in a plane, Gauss divergence theorem and stoke’s theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

UNIT III  ANALYTIC FUNCTIONS  12
Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy – Riemann equation and Sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping : w= z+c, cz, 1/z and bilinear transformation.

UNIT IV  COMPLEX INTEGRATION                    12

UNIT V  LAPLACE TRANSFORM                   12

TOTAL: 60 PERIODS

TEXT BOOK:

REFERENCES:
### BPH201 ENGINEERING PHYSICS – II

(\textit{Common to all branches})

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#### UNIT I CONDUCTING MATERIALS


#### UNIT II SEMICONDUCTING MATERIALS


#### UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS


#### UNIT IV DIELECTRIC MATERIALS


#### UNIT V MODERN ENGINEERING MATERIALS


**TOTAL:** 45 PERIODS

**TEXT BOOKS:**

2. Charles P. Poole and Frank J.Ownen, ‘Introduction to Nanotechnology’, Wiley India (2007) (for Unit V)
REFERENCES:
BCY201 ENGINEERING CHEMISTRY – II
(Common to all branches)

L T P C
3 0 0 3

AIM
To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.

OBJECTIVES
1. The student should be conversant with the principles of electrochemistry, electrochemical cells, emf and applications of emf measurements.
2. Principles of corrosion control.
3. Chemistry of Fuels and combustion.
4. Industrial importance of Phase rule and alloys.
5. Analytical techniques and their importance.

UNIT I ELECTROCHEMISTRY

UNIT II CORROSION AND CORROSION CONTROL

UNIT III FUELS AND COMBUSTION

UNIT IV PHASE RULE AND ALLOYS

UNIT V ANALYTICAL TECHNIQUES

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES:
(a) BME201  ENGINEERING MECHANICS  
(For Mechanical & Civil Branches)  

OBJECTIVE
At the end of this course the student should be able to understand the vectorial and scalar representation of forces and moments, static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. Further, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. He should be able to understand the laws of motion, the kinematics of motion and the interrelationship. He should also be able to write the dynamic equilibrium equation. All these should be achieved both conceptually and through solved examples.

UNIT I  BASICS & STATICS OF PARTICLES  12

UNIT II  EQUILIBRIUM OF RIGID BODIES  12

UNIT III  PROPERTIES OF SURFACES AND SOLIDS  12

UNIT IV  DYNAMICS OF PARTICLES  12

UNIT V  FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS  12

TOTAL: 60 PERIODS

TEXT BOOK:
REFERENCES:
(b) **BEE201**

**CIRCUIT THEORY**

(For EEE & EIE Branches)

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**UNIT I** BASIC CIRCUITS ANALYSIS  
12


**UNIT II** NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS  
12


**UNIT III** RESONANCE AND COUPLED CIRCUITS  
12


**UNIT IV** TRANSIENT RESPONSE FOR DC CIRCUITS  
12

Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. input (Sinusoidal).

**UNIT V** ANALYSING THREE PHASE CIRCUITS  
12

Three phase balanced / unbalanced voltage sources – analysis of three phase 3-wire and 4- wire circuits with star and delta connected loads, balanced & unbalanced loads – phasor diagram of voltages and currents – power and power factor measurements in three phase circuits.

**TOTAL: 60 PERIODS**

**TEXT BOOKS:**


**REFERENCES:**

(c) BEC201 ELECTRIC CIRCUITS AND ELECTRON DEVICES
(For ECE, CSE and IT Branches)

UNIT I  CIRCUIT ANALYSIS TECHNIQUES  12

UNIT II  TRANSIENT & RESONANCE IN RLC CIRCUITS  12

UNIT III  SEMICONDUCTOR DIODES  12

UNIT IV  TRANSISTORS  12
Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – Breakdown in transistors – operation and comparison of N-Channel and P-Channel JFET – drain current equation – MOSFET – Enhancement and depletion types – structure and operation – comparison of BJT with MOSFET – thermal effect on MOSFET.

UNIT V  SPECIAL SEMICONDUCTOR DEVICES (Qualitative Treatment only)  12
Tunnel diodes, PIN diode, varactor diode – SCR characteristics and two transistor equivalent model – UJT – Diac and Triac – Laser, CCD, Photodiode, Phototransistor, Photoconductive and Photovoltaic cells – LED, LCD.

TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
UNIT I ELECTRICAL CIRCUITS & MEASUREMENTS 12

UNIT II ELECTRICAL MACHINES 12

UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS 12

UNIT IV DIGITAL ELECTRONICS 12

UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING 12

TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
(b) BME202 BASIC CIVIL & MECHANICAL ENGINEERING

(For CSE, ECE, EEE, EIE & IT branches)

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A – CIVIL ENGINEERING

UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS


UNIT II BUILDING COMPONENTS AND STRUCTURES


TOTAL: 30 PERIODS

B – MECHANICAL ENGINEERING

UNIT III POWER PLANT ENGINEERING


UNIT IV IC ENGINES

Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.

UNIT V REFRIGERATION AND AIR CONDITIONING SYSTEM


TOTAL: 30 PERIODS

REFERENCES:

BCS231 COMPUTER PRACTICE LABORATORY – II
(Common to all branches) L T P C
0 1 2 2

LIST OF EXPERIMENTS

1. UNIX COMMANDS

Study of Unix OS – Basic Shell Commands – Vi Editor.

2. SHELL PROGRAMMING


3. C PROGRAMMING ON UNIX

Dynamic Storage Allocation – Pointers – Functions – File Handling.

TOTAL: 45 PERIODS

HARDWARE / SOFTWARE REQUIREMENTS FOR A BATCH OF 30 STUDENTS

Hardware

- UNIX Clone Server – 1 No
- Nodes (thin client or PCs) – 33 Nos
- Printer – 3 Nos.

Software

- OS – UNIX Clone (33 user license or License free Linux)
- Compiler - C
PHYSICS LABORATORY – II

LIST OF EXPERIMENTS
1. Determination of Young’s modulus of the material – non uniform bending.
2. Determination of Band Gap of a semiconductor material.
3. Determination of specific resistance of a given coil of wire – Carey Foster Bridge.
5. Spectrometer dispersive power of a prism.
6. Determination of Young’s modulus of the material – uniform bending.

• A minimum of FIVE experiments shall be offered.
• Laboratory classes on alternate weeks for Physics and Chemistry.

CHEMISTRY LABORATORY – II

LIST OF EXPERIMENTS
1. Conductometric titration (Simple acid base)
2. Conductometric titration (Mixture of weak and strong acids)
3. Conductometric titration using BaCl₂ Vs Na₂SO₄
4. Potentiometric Titration (Fe²⁺ Vs K₂Cr₂O₇)
5. pH Titration (Acid & Base)
6. Determination of water of crystallization of a crystalline salt (CuSO₄)
7. Estimation of Ferric ion by spectrophotometry.

• A minimum of FIVE experiments shall be offered.
• Laboratory classes on alternate weeks for Physics and Chemistry.
(a) BME231 COMPUTER AIDED DRAFTING AND MODELING LABORATORY  L  T  P  C
(For Mechanical & Civil Branches)  0 1 2 2

List of Exercises using software capable of Drafting and Modeling

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems
   (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general
   multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involute using Bspline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder,
   cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views
   (eg. V-block, Base of a mixie, Simple stool, Objects with hole and curves).
6. Drawing of a plan of residential building (Two bed rooms, kitchen, hall, etc.)
7. Drawing of a simple steel truss.
8. Drawing sectional views of prism, pyramid, cylinder, cone, etc,
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from
    3-D model.

Note: Plotting of drawings must be made for each exercise and attached to the records written
by students.

List of Equipments for a batch of 30 students:

1. Pentium IV computer or better hardware, with suitable graphics facility – 30 Nos.
2. Licensed software for Drafting and Modeling – 30 Licenses
3. Laser Printer or Plotter to print / plot drawings – 2 Nos.
(b) BEE231 ELECTRICAL CIRCUITS LABORATORY (For EEE & EIE branches)  
L T P C  
0 0 3 2  

LIST OF EXPERIMENTS  
- Verification of ohm’s laws and kirchoff’s laws.  
- Verification of Thevenin’s and Norton’s Theorem  
- Verification of superposition Theorem  
- Verification of maximum power transfer theorem.  
- Verification of reciprocity theorem  
- Measurement of self inductance of a coil  
- Verification of mesh and nodal analysis.  
- Transient response of RL and RC circuits for DC input.  
- Frequency response of series and parallel resonance circuits.  
- Frequency response of single tuned circuits.  

TOTAL: 45 PERIODS
(c) BEC231  CIRCUITS AND DEVICES LABORATORY
     (For ECE, CSE & IT branches) L T P C
     0 0 3 2

- Verification of KVL and KCL
- Verification of Thevenin and Norton Theorems.
- Verification of superposition Theorem.
- Verification of Maximum power transfer and reciprocity theorems.
- Frequency response of series and parallel resonance circuits.
- Characteristics of PN and Zener diode
- Characteristics of CE configuration
- Characteristics of CB configuration
- Characteristics of UJT and SCR
- Characteristics of JFET and MOSFET
- Characteristics of Diac and Triac.
- Characteristics of Photodiode and Phototransistor.

TOTAL: 45 PERIODS
BEG231  ENGLISH LANGUAGE SKILL LABORATORY (Skill of Listening)   L  T  P  C
(Common to all branches)  0  0  3   2

UNIT I (Micro Skills I)                      4
Tasks (Type I):  Lexical word identification
   A. Identifying the homophones/words with silent letters/often mispronounced words
   B. Identifying the missing words in native speech (Native accent)

Tasks (Type II):  Decompressing structures
   A. Expanding sound units into word clusters (Ex: verbs with multiple auxiliaries/contracted forms)
   B. Identifying the constituent words in collocations/compound words/idiomatic phrases

UNIT II (Micro Skills II):  Identifying tonal variations for meaning making                6
Tasks:
   A. Punctuating the script after listening to it.
   B. Marking word chunks/tone groups in transcript after listening to it.
   C. Marking syllable stress in words.
   D. Identifying tonal variations expressing rhetorical questions/ information seeking Questions / Exclamations / General statements.

UNIT III Content Comprehension and Making Inferences                12
Tasks:
   A. Listening and filling in the chart
   B. Multiple choice questions (Negative/factual)
   C. True/False questions
   D. Questions with multiple answers (choosing two/three correct answers)
   E. Matching information
   F. Filling the blanks (not more than three words)
   G. Comprehending the text organization

UNIT IV Listening and act                   8
Tasks:
   A. Locating spots in a map following the given directions
   B. Transferring data to graphs/diagrams/flow charts
   C. Diagram/Picture completing tasks
   D. Finding the answer through the process of elimination

TOTAL: 30 PERIODS
BMA301  TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS  L T P C
(Common to all branches)  3 1 0 4

OBJECTIVES
The course objective is to develop the skills of the students in the areas of Transforms and Partial Differential Equations. This will be necessary for their effective studies in a large number of engineering subjects like heat conduction, communication systems, electro-optics and electromagnetic theory. The course will also serve as a prerequisite for post graduate and specialized studies and research.

UNIT I  FOURIER SERIES  (9L+3T)

UNIT II  FOURIER TRANSFORMS  (9L+3T)

UNIT III  PARTIAL DIFFERENTIAL EQUATIONS  (9L+3T)
Formation of partial differential equations – Lagrange’s linear equation – Solutions of standard types of first order partial differential equations - Linear partial differential equations of second and higher order with constant coefficients.

UNIT IV  APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS  (9L+3T)
Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of heat conduction (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates.

UNIT V  Z - TRANSFORMS AND DIFFERENCE EQUATIONS  (9L+3T)

Lectures: 45   Tutorials: 15   Total: 60 Periods

TEXT BOOK

REFERENCES
BCS303 DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING IN C++

AIM
1. To provide an in-depth knowledge in problem solving techniques and data structures.

OBJECTIVES
1. To learn the systematic way of solving problems.
2. To understand the different methods of organizing large amounts of data.
3. To learn programs in C++.
4. To efficiently implement the different data structures.
5. To efficiently implement solutions for specific problems.

UNIT I PRINCIPLES OF OBJECT ORIENTED PROGRAMMING 9
Introduction, Tokens, Expressions, contour Structures, Functions in C++, classes and objects, constructors and destructors, operators overloading and type conversions.

UNIT II ADVANCED OBJECT ORIENTED PROGRAMMING 9
Inheritance, Extending classes, Pointers, Virtual functions and polymorphism, File Handling Templates, Exception handling, Manipulating strings.

UNIT III DATA STRUCTURES & ALGORITHMS 9
Algorithm, Analysis, Lists, Stacks and queues, Priority queues, Binary Heap-Application, Heaps, hashing, hash tables without linked lists.

UNIT IV NONLINEAR DATA STRUCTURES 9
Trees-Binary trees, search tree ADT, AVL trees, Graph Algorithms, Topological sort, shortest path algorithm network flow problems, minimum spanning tree, Introduction to NP-completeness.

UNIT V SORTING AND SEARCHING 9
Sorting - Insertion sort, Shell sort, Heap sort, Merge sort, Quick sort, Indirect sorting, Bucket sort, Introduction to Algorithm Design Techniques -Greedy algorithm (Minimum Spanning Tree), Divide and Conquer (Merge Sort), Dynamic Programming (All pairs Shortest Path Problem).

TOTAL: 45

TEXT BOOKS:

REFERENCES
BEC301  DIGITAL ELECTRONICS

L T P C
3 1 0 4

AIM
- To learn the basic methods for the design of digital circuits and provide the fundamental concepts used in the design of digital systems.

OBJECTIVES
- To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
- To introduce the methods for simplifying Boolean expressions.
- To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits.
- To introduce the concept of memories and programmable logic devices.
- To illustrate the concept of synchronous and asynchronous sequential circuits

UNIT I  MINIMIZATION TECHNIQUES AND LOGIC GATES
Minimization Techniques: Boolean postulates and laws, De-Morgan's Theorem Principle of Duality, Boolean expression, Minimization of Boolean expressions Minterm, Maxterm, Sum of Products (SOP), Product of Sums (POS), Karnaugh map Minimization, Don't care conditions, Quine-McCluskey method of minimization.
Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR, Implementations of Logic Functions using gates, NAND-NOR implementations, Multi level gate implementations, Multi output gate implementations. TTL and CMOS Logic and their characteristics, Tristate gates.

UNIT II  COMBINATIONAL CIRCUITS

UNIT III  SEQUENTIAL CIRCUITS

UNIT IV  MEMORY DEVICES
Classification of memories, ROM - ROM organization, PROM, EPROM, EEPROM, EAPROM, RAM - RAM organization, Write operation, Read operation, Memory cycle, Timing wave forms, Memory decoding, memory expansion, Static RAM Cell, Bipolar RAM cell, MOSFET RAM cell, Dynamic RAM cell, Programmable Logic Devices, Programmable Logic Array (PLA), Programmable Array Logic (PAL), Field Programmable Gate Arrays (FPGA), Implementation of combinational logic circuits using ROM, PLA, PAL

UNIT V  SYNCHRONOUS AND AYNCHRONOUS SEQUENTIAL CIRCUITS
Synchronous Sequential Circuits: General Model, Classification, Design, Use of Algorithmic State Machine, Analysis of Synchronous Sequential Circuits
Asynchronous Sequential Circuits: Design of fundamental mode and pulse mode circuits, incompletely specified State Machines, Problems in Asynchronous Circuits, Design of Hazard Free Switching circuits. Design of Combinational and Sequential circuits using VERILOG.
TEXT BOOKS

REFERENCES
BEC302  SIGNALS AND SYSTEMS  L T P C

3 1 0 4

AIM
- To study and analyze the characteristics of continuous, discrete signals and systems.

OBJECTIVES
- To study the properties and representation of discrete and continuous signals.
- To study the sampling process and analysis of discrete systems using z transforms.
- To study the analysis and synthesis of discrete time systems.

UNIT I  CLASSIFICATION OF SIGNALS AND SYSTEMS  9
Continuous time signals (CT signals), discrete time signals (DT signals), Step, Ramp, Pulse, Impulse, Exponential, classification of CT and DT signals, periodic and aperiodic, random signals, CT systems and DT systems, Basic properties of systems, Linear Time Invariant systems and properties.

UNIT II  ANALYSIS OF CONTINUOUS TIME SIGNALS  9
Fourier series analysis, Spectrum of CT signals, Fourier Transform and Laplace Transform in Signal Analysis.

UNIT III  LINEAR TIME INVARIANT -CONTINUOUS TIME SYSTEMS  9
Differential equation, Block diagram representation, Impulse response, Convolution integral, frequency response, Fourier and Laplace transforms in analysis, State variable equations and matrix representation of systems.

UNIT IV  ANALYSIS OF DISCRETE TIME SIGNALS  9
Sampling of CT signals and aliasing, DTFT and properties, Z-transform and properties of Z-transform.

UNIT V  LINEAR TIME INVARIANT - DISCRETE TIME SYSTEMS  9
Difference equations, Block diagram representation, Impulse response, Convolution sum, LTI systems analysis using DTFT and Z-transforms, State variable equations and matrix representation of systems.

Lectures: 45 Tutorials: 15 Total: 60

TEXT BOOKS:

REFERENCES:
BEC303 ELECTRONIC CIRCUITS – I  L T P C
3 1 0 4

AIM
• The aim of this course is to familiarize the student with the analysis and design of basic
  Transistor, Amplifier circuits and power supplies.

OBJECTIVES
On completion of this course the student will understand
• The methods of biasing transistors.
• Design of simple amplifier circuits.
• Midband analysis of amplifier circuits using small - signal equivalent circuits to determine
  gain input impedance and output impedance.
• Method of calculating cutoff frequencies and to determine bandwidth.
• Design of power amplifiers.
• Analysis and design of power supplies.

UNIT I TRANSISTOR BIASING AND STABILITY ANALYSIS 9
BJT, Need for biasing, Stability factor, fixed bias circuit, Load line and quiescent point. Variation of
quiescent point due to $h_{FE}$ variation within manufacturer’s tolerance, Stability factors, Different types
of biasing circuits, Method of stabilizing the Q point, Advantage of Self bias (voltage divider bias)
over other types of biasing, Bias compensation, Diode, Thermistor and Sensistor compensations,
Biasing the FET and MOSFET.

UNIT II MIDBAND ANALYSIS OF SMALL SIGNAL AMPLIFIERS 9
CE, CB and CC amplifiers, Method of drawing small-signal equivalent circuit, Midband analysis of
various types of single stage amplifiers to obtain gain, input impedance and output impedance,
Miller's theorem, Comparison of CB, CE and CC amplifiers and their uses, Methods of increasing
input impedance using Darlington connection and bootstrapping, CS, CG and CD (FET) amplifiers,
Multistage amplifiers. Basic emitter coupled differential amplifier circuit, Bisection theorem.
Differential gain, CMRR, Use of constant current circuit to improve CMRR, Derivation of transfer
characteristic.

UNIT III FREQUENCY RESPONSE OF AMPLIFIERS 9
General shape of frequency response of amplifiers, Definition of cutoff frequencies and bandwidth,
Low frequency analysis of amplifiers to obtain lower cutoff frequency Hybrid -∏ equivalent circuit of
BJTs, High frequency analysis of BJT amplifiers to obtain upper cutoff frequency, Gain Bandwidth
Product, High frequency equivalent circuit of FETs, High frequency analysis of FET amplifiers, Gain-
bandwidth product of FETs, General expression for frequency response of multistage amplifiers ,
Calculation of overall upper and lower cutoff frequencies of multistage amplifiers, Amplifier rise
time, sag and their relation to cutoff frequencies.

UNIT IV LARGE SIGNAL AMPLIFIERS 9
Classification of amplifiers, Class A large signal amplifiers, and second harmonic distortion, higher
order harmonic distortion, transformer-coupled class A audio power amplifier, efficiency of Class A
amplifiers. Class B amplifier, efficiency, push-pull amplifier, distortion in amplifiers, complementary-
symmetry (Class B) push-pull amplifier, Class C, Class D amplifier, Class S amplifier, MOSFET
power amplifier, Thermal stability and heat sink.

UNIT V RECTIFIERS AND POWER SUPPLIES 9
Classification of power supplies, Rectifiers, Half-wave, full-wave and bridge rectifiers with resistive
load. Analysis for $V_{dc}$ and ripple voltage with C, L, LC and CLC filters, Voltage multipliers, Voltage
regulators, Zener diode regulator, principles of obtaining a regulated power supply, regulator with
current limiting, Over voltage protection, Switched mode power supply (SMPS), Power control using SCR.

Lectures: 45 Tutorials: 15 Total: 60

TEXT BOOKS

REFERENCES
BEE306          ELECTRICAL ENGINEERING        L   T   P   C
                          3   0   0   3

AIM

• To expose the students to the concepts of various types of electrical machines and transmission and distribution of electrical power.

OBJECTIVES

To impart knowledge on

• Constructional details, principle of operation, performance, starters and testing of D.C. machines.
• Constructional details, principle of operation and performance of transformers.
• Constructional details, principle of operation and performance of induction motors.
• Constructional details and principle of operation of alternators and special machines.
• Power System transmission and distribution.

UNIT I  D.C. MACHINES


UNIT II  TRANSFORMERS


UNIT III  INDUCTION MOTORS


UNIT IV  SYNCHRONOUS AND SPECIAL MACHINES


UNIT V  TRANSMISSION AND DISTRIBUTION


TOTAL: 45

TEXT BOOKS


REFERENCES

BEC331  DIGITAL ELECTRONICS LABORATORY

- Design and implementation of Adder and Subtractor using logic gates.
- Design and implementation of code converters using logic gates
  - BCD to excess-3 code and vice versa
  - Binary to gray and vice-versa.
- Design and implementation of 4 bit binary Adder/subtractor and BCD adder using IC 7483.
- Design and implementation of 2 bit Magnitude Comparator using logic gates and 8 bit Magnitude Comparator using IC 7485.
- Design and implementation of 16 bit odd/even parity checker generator using IC74180.
- Design and implementation of Multiplexer and De-multiplexer using logic gates and study of IC74150 and IC 74154.
- Design and implementation of encoder and decoder using logic gates and study of IC7445 and IC74147.
- Construction and verification of 4 bit ripple counter and Mod-10 / Mod-12 Ripple counters.
- Design and implementation of 3-bit synchronous up/down counter
- Implementation of SISO, SIPO, PISO and PIPO shift registers using Flip-flops.
- Design of experiments 1, 6, 8 and 10 using Verilog Hardware Description Language

TOTAL: 45
BEC332 ELECTRONIC CIRCUITS LABORATORY

E.No.1 Fixed Bias amplifier circuit using BJT
   i. Waveforms at input and output without bias.
   ii. Determination of bias resistance to locate Q-point at center of load line.
   iii. Plot the frequency response & Determination of Gain Bandwidth Product

E.No.2 Design and construct BJT Common Emitter Amplifier using voltage divider bias (self-bias).
   i. Measurement input and output impedances
   ii. Plot the frequency response & Determination of Gain Bandwidth Product

E.No.3 Design and construct BJT Common Collector Amplifier using voltage divider bias (self-bias).
   i. Measurement of input and output impedances.
   ii. Plot the frequency response & Determination of Gain Bandwidth Product

E.No.4 Design and construct BJT Common Base Amplifier using voltage divider bias (self-bias).
   i. Measurement of input and output impedances.
   ii. Plot the frequency response & Determination of Gain Bandwidth Product

E.No.5 Darlington Amplifier using BJT
   i. Measurement of input and output impedances.
   ii. Comparison with calculated values.
   iii. Plot the frequency response & Determination of Gain Bandwidth Product

E.No.6 Source follower with Bootstrapped gate resistance
   i. Measurement of gain, input resistance and output resistance with and without Bootstrapping.
   ii. Comparison with calculated values.

E.No.7 Differential amplifier using BJT
   i. Measurement of CMRR.

E.No.8 Class A Power Amplifier
   i. Observation of output waveform.
   ii. Measurement of maximum power output.
   iii. Determination of efficiency.
   iv. Comparison with calculated values.

E.No.9 Class B Complementary symmetry power amplifier
   i. Observation of the output waveform with crossover Distortion.
   ii. Modification of the circuit to avoid crossover distortion.
   iii. Measurement of maximum power output.
   iv. Determination of efficiency.
   v. Comparison with calculated values.

E.No.10 Half wave rectifier without and with filter.
   i. Measurement of DC and ripple (ac) voltages at the output under different loading conditions but without Filter.
   ii. Measurement of DC and ripple (ac) voltages at the output under different loading conditions but with Filter.
   iii. Calculation of ripple factor under different loading conditions with and without filter.
   iv. Comment on calculated ripple factor values.
E.No.11 Full wave rectifier without and with filter
   i. Measurement of DC and ripple (ac) voltages at the output under different loading conditions but without Filter.
   ii. Measurement of DC and ripple (ac) voltages at the output under different loading conditions but with Filter
   iii. Calculation of ripple factor under different loading conditions with and without filter.
       Comment on calculated ripple factor values.

E.No.12 Power Supply circuit - Full wave rectifier with simple capacitor filter and Zener Voltage Regulator
   i. Measurement of DC output voltage under different loading conditions.
   ii. Plot the Load regulation characteristics and calculate the Load regulation.

TOTAL: 45
BCS333   DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING
         LABORATORY

1. Basic Programs for C++ Concepts
2. Array implementation of List Abstract Data Type (ADT)
3. Linked list implementation of List ADT
4. Cursor implementation of List ADT
5. Stack ADT - Array and linked list implementations

The next two exercises are to be done by implementing the following source files
   (a) Program source files for Stack Application 1
   (b) Array implementation of Stack ADT
   (c) Linked list implementation of Stack ADT
   (d) Program source files for Stack Application 2

An appropriate header file for the Stack ADT should be #included in (a) - (d)

6. Implement any Stack Application using array implementation of Stack ADT (by implementing files
   (a) and (b) given above) and then using linked list implementation of Stack ADT (by using files (a)
   and implementing file (e))
7. Queue ADT – Array and linked list implementations
8. Search Tree ADT - Binary Search Tree
9. Heap Sort
10. Quick Sort

TOTAL: 45
BEG331 COMMUNICATION SKILLS AND TECHNICAL SEMINAR – I  L  T  P  C
(Common to all branches)  0  0  3  2
(To be conducted as a Practical Paper by the Depts of English for 3 hrs per week)

OBJECTIVES:
1. To improve the learners’ oral fluency in English
2. To help the learners acquire the readiness to speak in English
3. To develop the sub-skills required for paper presentations and group discussions
4. To help the learners improve their vocabulary related to specific fields of technology
5. To facilitate the development of the learners’ proficiency in meaningful interaction
6. To provide them linguistic support for managing vital sub-functions of Communication

COURSE CONTENT:
A) Phonetic practice (7 hrs)
   1. English phonemes with special emphasis on the diphthongs
   2. Stress patterns for words that end with specific suffixes.

B) Speech practice (8 hrs)
   1. Speaking on the themes by developing the hints provided.
   The themes are:
      1. Cloning
      2. Artificial satellites
      3. Renewable sources
      4. Telecommunication
      5. Cyber Revolution
      6. Space research
      7. Polythene pollution
      8. Fossil fuels
      9. Climate change
     10. Ecological threats
     11. Water resources
     12. Nuclear technology
     13. Scientific farming
     14. Thermal power plants
     15. Natural calamities
     16. Robotics
     17. Artificial intelligence
     18. Role of Fibre Optics
     19. Exploration of Mars
     20. Gas turbines

C) Group Quiz on technical aspects related to the themes (4hrs)

D) Language Functions (8 hrs)
   • comparing and contrast
   • reporting the conversation of others.
   • talking about future plans and intentions
   • giving reasons
   • expressing preferences
   • quantifying
   • expressing certainty and uncertainty
   • expressing opinions and impressions
   • making suggestions
expressing assumptions  
evaluating options  
hypothesing/deducing  
defending a point of view

E) Seminar presentation on the themes allotted (18 hrs)
PROCEDURE:
A) Phonetic practice
All the speech sounds should be taught. The learners should be given drills in the pronunciation of at least 30 words for each sound. While practicing stress patterns, they should be encouraged to identify as many words as possible for each suffix ending.

B) Speech practice
Every student should be allowed to choose one theme to specialize in. (However not more than 4 students in a section can choose the same theme). The teacher has to prepare at least 4 hints development tasks on each theme and should provide chance to each learner to speak on those hints related to his/ her theme (5 minutes). The hints may be supplied to the students in advance. When a student speaks, the class should be encouraged to ask questions as well as note down the words related to the different fields.

C) Group Quiz on technical phrases related to the themes.
The class should be divided into groups that specialize on a particular theme. Each group should conduct a quiz (question & answer session) which will be answered by the other groups.

D) Language Functions
The teacher should build micro activities to develop the use of language required to handle these sub-functions of communication. In the process, the learners should get used to the linguistic elements needed for these functions.

E) Seminar presentation on the themes allotted
Each student should collect materials from books, journals and newspapers for his/her theme and prepare a short seminar paper. The presentation should be for 10 minutes. It should be followed ‘open house’ during which others should come forward to question, clarify, supplement or evaluate.

RECORD LAY OUT:
Every student has to maintain a record in which he/she has to incorporate the following details.
2. First page containing learner details and the topic of specialization.
3. Twenty words for each phoneme
4. Twenty words with stress marks for each suffix ending
5. Vocabulary list (technical words and compound words) related to the 20 themes identified for this semester.
6. Three newspaper items, two journal items and three internet sources related to the special theme selected by the student.(To be pasted on the pages)
7. The Quiz questions of the group with expected answers.
8. The seminar paper presented by the learner with details about the open house.
9. Notes of observation. (Details about any three seminar paper presentations by others)
10. The record should be duly signed by the course teacher and submitted to the External Examiner for verification during the semester practicals.

P = 45 Total = 45
BEC401        ELECTRONIC CIRCUITS – II        L  T  P  C
            3  1  0  4

AIM
1. The aim of this course is to familiarize the student with the analysis and design of feedback amplifiers, oscillators, tuned amplifiers, wave shaping circuits, multivibrators and blocking oscillators.

OBJECTIVES
On completion of this course the student will understand
2. The advantages and method of analysis of feedback amplifiers.
3. Analysis and design of LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, blocking oscillators and time base generators.

UNIT I        FEEDBACK AMPLIFIERS
Block diagram, Loop gain, Gain with feedback, Effects of negative feedback, Sensitivity and desensitivity of gain, Cut-off frequencies, distortion, noise, input impedance and output impedance with feedback, Four types of negative feedback connections, voltage series feedback, voltage shunt feedback, current series feedback and current shunt feedback, Method of identifying feedback topology and feedback factor, Nyquist criterion for stability of feedback amplifiers.

UNIT II        OSCILLATORS

UNIT III        TUNED AMPLIFIERS
Coil losses, unloaded and loaded Q of tank circuits, small signal tuned amplifiers, Analysis of capacitor coupled single tuned amplifier, double tuned amplifier, effect of cascading single tuned and double tuned amplifiers on bandwidth, Stagger tuned amplifiers, large signal tuned amplifiers, Class C tuned amplifier, Efficiency and applications of Class C tuned amplifier Stability of tuned amplifiers, Neutralization, Hazeltine neutralization method.

UNIT IV        WAVE SHAPING AND MULTIVIBRATOR CIRCUITS

UNIT V        BLOCKING OSCILLATORS AND TIMEBASE GENERATORS
UJT Sawtooth waveform generator, Pulse transformers, equivalent circuit, response, applications, Blocking oscillator, Free running blocking oscillator, Astable Blocking Oscillators with base timing, Push-pull Astable blocking oscillator with emitter timing, Frequency control using core saturation, Triggered blocking oscillator, Monostable blocking oscillator with base timing, Monostable blocking oscillator with emitter timing, Time base circuits, Voltage-Time base circuit, Current-Time base circuit, Linearization through adjustment of driving waveform.

TEXT BOOKS

Lectures: 45 Tutorials: 15 Total: 60
REFERENCES

BEC402  COMMUNICATION THEORY  

**AIM**
1. To study the various analog communication fundamentals viz., Amplitude modulation and demodulation, angle modulation and demodulation. To study Noise performance of various receivers and information theory with source coding theorem.

**OBJECTIVES**
2. To provide various Amplitude modulation and demodulation systems.
3. To provide various Angle modulation and demodulation systems.
4. To provide some depth analysis in noise performance of various receiver.
5. To study some basic information theory with some channel coding theorem.

**UNIT I AMPLITUDE MODULATION SYSTEMS**
Review of spectral characteristics of Periodic and Non-periodic signals; Generation and Demodulation of AM, DSBSC, SSB and VSB Signals; Comparison of Amplitude Modulation Systems; Frequency Translation; FDM; Non - Linear Distortion.

**UNIT II ANGLE MODULATION SYSTEMS**
Phase and Frequency Modulation; Single tone, Narrow Band and Wideband FM, Transmission Bandwidth, Generation and Demodulation of FM Signal.

**UNIT III NOISE THEORY**
Review of Probability, Random Variables and Random Process; Gaussian Process, Noise - Shot noise, Thermal noise and white noise; Narrow band noise, Noise temperature; Noise Figure.

**UNIT IV PERFORMANCE OF CW MODULATION SYSTEMS**
Super heterodyne Radio receiver and its characteristic, SNR, Noise in DSBSC systems using coherent detection, Noise in AM system using envelope detection and its FM system, FM threshold effect, Pre-emphasis and De-emphasis in FM, Comparison of performances.

**UNIT V INFORMATION THEORY**
Discrete Messages and Information Content, Concept of Amount of Information, Average information, Entropy, Information rate, Source coding to increase average information per bit, Shannon-Fanon coding, Huffman coding, Lempel-Ziv (LZ) coding, Shannon’s Theorem, Channel Capacity, Bandwidth- S/N trade-off, Mutual information and channel capacity, rate distortion theory, Lossy Source coding.

**TEXT BOOKS**

**REFERENCES**

**L T P C**
3 1 0 4

**Lectures: 45 Tutorials: 15 Total: 60**
### BEC403  ELECTROMAGNETIC FIELDS

**AIM**
1. To familiarize the student to the concepts, calculations and pertaining to electric, magnetic and electromagnetic fields so that an in depth understanding of antennas, electronic devices, and waveguides are possible.

**OBJECTIVES**
1. To analyze field potentials due to static changes.
2. To evaluate static magnetic fields.
3. To understand how materials affect electric and magnetic fields.
4. To understand the relation between the fields under time varying situations.
5. To understand principles of propagation of uniform plane waves.

**UNIT I  STATIC ELECTRIC FIELDS**
- Introduction to Co-ordinate System - Rectangular, Cylindrical and Spherical Co-ordinate System,
- Introduction to line, Surface and Volume Integrals, Definition of Curl, Divergence and Gradient,
- Meaning of Stokes theorem and Divergence theorem.
- Coulomb's Law in Vector Form, Definition of Electric Field Intensity, Principle of Superposition,
- Electric Field due to discrete charges, Electric field due to continuous charge distribution, Electric Field due to charges distributed uniformly on an infinite and finite line, Electric Field on the axis of a uniformly charged circular disc, Electric Field due to an infinite uniformly charged sheet.
- Electric Scalar Potential, Relationship between potential and electric field, Potential due to infinite uniformly charged line, Potential due to electrical dipole, Electric Flux Density, Gauss Law, Proof of Gauss Law, Applications.

**UNIT II  STATIC MAGNETIC FIELD**
- The Biot-Savart Law in vector form , Magnetic Field intensity due to a finite and infinite wire carrying a current I, Magnetic field intensity on the axis of a circular and rectangular loop carrying a current I, Ampere's circuital law and simple applications. Magnetic flux density, The Lorentz force equation for a moving charge and applications, Force on a wire carrying a current I placed in a magnetic field, Torque on a loop carrying a current I, Magnetic moment, Magnetic Vector Potential.

**UNIT III  ELECTRIC AND MAGNETIC FIELDS IN MATERIALS**
- Poisson's and Laplace's equation, Electric Polarization,Nature of dielectric materials, Definition of Capacitance, Capacitance of various geometries using Laplace's equation, Electrostatic energy and energy density, Boundary conditions for electric fields, Electric current, Current density, point form of ohm's law, continuity equation for current. Definition of Inductance, Inductance of loops and solenoids,Definition of mutual inductance, simple examples. Energy density in magnetic fields, Nature of magnetic materials, magnetization and permeability, magnetic boundary conditions.

**UNIT IV  TIME VARYING ELECTRIC AND MAGNETIC FIELDS**

**UNIT V  ELECTRO MAGNETIC WAVES**
- Derivation of Wave Equation, Uniform Plane Waves, Maxwell's equation in Phasor form, Wave equation in Phasor form, Plane waves in free space and in a homogenous material. Wave equation for a conducting medium, Plane waves in lossy dielectrics, Propagation in good conductors, Skin effect, Linear, Elliptical and circular polarization, Reflection of Plane Wave from a conductor, normal incidence, Reflection of Plane Waves by a perfect dielectric, normal and oblique incidence, Dependence on Polarization, Brewster angle.
Lectures: 45 Tutorials: 15 Total: 60

TEXT BOOKS

REFERENCES
BMA403 PROBABILITY AND RANDOM PROCESSES

AIM

1. This course aims at providing the necessary basic concepts in random processes. Knowledge of fundamentals and applications of random phenomena will greatly help in the understanding of topics such as signals & systems, pattern recognition, voice and image processing and filtering theory.

OBJECTIVES

At the end of the course, the students would

1. Have a fundamental knowledge of the basic probability concepts.
2. Have a well-founded knowledge of standard distributions which can describe real life phenomena.
3. Acquire skills in handling situations involving more than one random variable and functions of random variables.
4. Understand and characterize phenomena which evolve with respect to time in probabilistic manner.
5. Be able to analyze the response of random inputs to linear time invariant systems.

UNIT I RANDOM VARIABLES (9L+3T)
Discrete and continuous random variables – Moments - Moment generating functions and their properties. Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and normal distributions – Function of random variable.

UNIT II TWO DIMENSIONAL RANDOM VARIABLE (9L+3T)
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Regression – Transformation of random variables - Central limit theorem (for 2-D random variables)

UNIT III CLASSIFICATION OF RANDOM PROCESSES (9L+3T)

UNIT IV CORRELATION AND SPECTRAL DENSITIES (9L+3T)

UNIT V LINEAR SYSTEMS WITH RANDOM INPUTS (9L+3T)
Linear time invariant system - System transfer function – Linear systems with random inputs– Auto correlation and cross correlation functions of input and output – White noise.

Lectures: 45  Tutorials: 15  Total: 60 Periods

TEXT BOOKS


REFERENCES

BEC404  LINEAR INTEGRATED CIRCUITS  L  T  P  C
3 0 0 3

AIM:
1. To teach the basic concepts in the design of electronic circuits using linear integrated circuits and their applications in the processing of analog signals.

OBJECTIVES
1. To introduce the basic building blocks of linear integrated circuits.
2. To teach the linear and non-linear applications of operational amplifiers.
3. To introduce the theory and applications of analog multipliers and PLL.
4. To teach the theory of ADC and DAC.
5. To introduce the concepts of waveform generation and introduce some special function ICs.

UNIT I  IC FABRICATION AND CIRCUIT CONFIGURATION FOR LINEAR ICS  9
Advantages of IC over discrete components, Manufacturing process of monolithic IC, Construction of monolithic bipolar transistor, Monolithic diodes, Integrated Resistors, Monolithic Capacitors, Inductors. Current mirror and current sources, Current sources as active loads, Voltage sources, Reference, BJT Differential amplifier with active loads, General operational amplifier stages and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and closed loop configurations.

UNIT II  APPLICATIONS OF OPERATIONAL AMPLIFIERS  9
Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters.

UNIT III  ANALOG MULTIPLIER AND PLL  9
Analog Multiplier using Emitter Coupled Transistor Pair, Gilbert Multiplier cell, Variable transconductance technique, Analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing.

UNIT IV  ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS  9

UNIT V  WAVEFORM GENERATORS AND SPECIAL FUNCTION ICs  9
Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, IC L8038 function generator, Timer IC 555, IC Voltage regulators, Three terminal fixed and adjustable voltage regulators, IC 723 general purpose regulator, Monolithic switching regulator, Switched capacitor filter IC MF10, Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Opto - couplers and fibre optic IC.

TOTAL:  45

TEXT BOOKS:
REFERENCES:
BEC405 CONTROL SYSTEMS ANALYSIS AND DESIGN

OBJECTIVES
1. To understand the open loop and closed loop (feedback) systems.
2. To understand time domain and frequency domain analysis of control systems required for stability analysis.
3. To understand the compensation technique that can be used to stabilize control systems.

UNIT I CONTROL SYSTEM MODELING
Basic Elements of Control System, Open loop and Closed loop systems, Differential equation, Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems, Block diagram reduction Techniques, Signal flow graph.

UNIT II TIME RESPONSE ANALYSIS
Time response analysis, First Order Systems, Impulse and Step Response analysis of second order systems, Steady state errors, P, PI, PD and PID Compensation, Analysis using MATLAB.

UNIT III FREQUENCY RESPONSE ANALYSIS
Frequency Response, Bode Plot, Polar Plot, Nyquist Plot, Frequency Domain specifications from the plots, Constant M and N Circles, Nichol's Chart, Use of Nichol's Chart in Control System Analysis. Series, Parallel, series-parallel Compensators, Lead, Lag, and Lead Lag Compensators, Analysis using MATLAB.

UNIT IV STABILITY ANALYSIS

UNIT V STATE VARIABLE ANALYSIS & DIGITAL CONTROL SYSTEMS
State space representation of Continuous Time systems, State equations, Transfer function from State Variable Representation, Solutions of the state equations, Concepts of Controllability and Observability, State space representation for Discrete time systems. Sampled Data control systems, Sampling Theorem, Sample & Hold, Open loop & Closed loop sampled data systems.

Lectures: 45 Tutorials: 15 Total: 60

TEXTBOOK

REFERENCES:
BEC431  ELECTRONICS CIRCUITS AND SIMULATION LABORATORY

L  T  P  C
0  0  3  2

Design of following circuits
1. Series and Shunt feedback amplifiers: Frequency response, Input and output impedance calculation
2. RC Phase shift oscillator, Wien Bridge Oscillator
3. Hartley Oscillator, Colpitts Oscillator
4. Tuned Class C Amplifier
5. Integrators, Differentiators, Clippers and Clampers
6. Astable, Monostable and Bistable multivibrators

SIMULATION USING PSPICE:
- Differential amplifier
- Active filters: Butterworth 2nd order LPF, HPF (Magnitude & Phase Response)
- Astable, Monostable and Bistable multivibrator - Transistor bias
- D/A and A/D converters (Successive approximation)
- Analog multiplier
- CMOS Inverter, NAND and NOR

TOTAL: 45
BEC432  LINEAR INTEGRATED CIRCUITS LABORATORY  

Design and testing of:

1. Inverting, Non inverting and Differential amplifiers.
2. Integrator and Differentiator.
3. Instrumentation amplifier
4. Active lowpass, Highpass and bandpass filters.
6. Phase shift and Wien bridge oscillators using op-amp.
7. Astable and monostable multivibrators using NE 555 Timer.
8. PLL characteristics and its use as Frequency Multiplier.
9. DC power supply using LM317 and LM723.
10. Study of SMPS.
11. Simulation of Experiments 3, 4, 5, 6 and 7 using PSpice netlists.

Note: Op-Amps uA741, LM 301, LM311, LM 324 & AD 633 may be used.

TOTAL: 45
BEE434       ELECTRICAL ENGINEERING AND CONTROL SYSTEM LABORATORY

AIM
To expose the students to the basic operations of electrical machines and help them to develop experimental skills.
1. To study the concepts, performance characteristics, time and frequency response of linear systems.
2. To study the effects of controllers.

EXPERIMENTS
a. Open circuit and load characteristics of separately excited and self excited D.C. generator.
b. Load test on D.C. shunt motor.
c. Swinburne’s test and speed control of D.C. shunt motor.
d. Load test on single phase transformer and open circuit and short circuit test on single phase transformer
e. Regulation of three phase alternator by EMF and MMF methods.
f. Load test on three phase induction motor.
g. No load and blocked rotor tests on three phase induction motor (Determination of equivalent circuit parameters)
h. Study of D.C. motor and induction motor starters.
i. Digital simulation of linear systems.
j. Stability Analysis of Linear system using Matlab.
k. Study the effect of P, PI, PID controllers using Matlab.
l. Design of Lead and Lag compensator.
m. Transfer Function of separately excited D.C. Generator.
n. Transfer Function of armature and Field Controller D.C. Motor.

TOTAL: 45
BEG431  COMMUNICATION SKILLS AND TECHNICAL SEMINAR – II  L T P C 0 0 3 2
(Common to all branches)
(To be conducted as a Practical Paper by the Depts of English for 3 hrs per week)

OBJECTIVES:
• To improve the learners’ oral fluency in English
• To help the learners acquire the readiness to speak in English
• To develop the sub-skills required for paper presentations and group discussions
• To help the learners improve their vocabulary related to specific fields of technology
• To facilitate the development of the learners’ proficiency in meaningful interaction
• To provide them linguistic support for managing vital sub-functions of communication.

COURSE CONTENT:
A) Phonetic practice (7 hrs)
All the English phonemes with special emphasis on the following
  1. /æ/ and /ei/
  2. /e/ and /i/
  3. First syllable and second syllable stress
  4. Three different ways of pronouncing ‘ed’ past tense endings eg. ‘played’, ‘walked’, ‘wanted’
  5. Correct pronunciation of commonly used words (A list of 1000 words will be suggested by the university)
  6. Silent letters

B) Speech practice (8 hrs)
Speaking on the themes by developing the hints provided.
The themes are:
  1. Indian space missions
  2. Converting agricultural wastes for useful purposes
  3. Developments in transportation
  4. Technology and agriculture
  5. Impact of global warming
  6. Desalination of water
  7. Technology for national security
  8. Industrial development and ecological issues
  9. Applications of nano technology
  10. Hazards of e-waste

C) Preparation of power point frames on the given topic (2 hrs)
(Only pictures, graphs, equations should be given through power point and not the text of the presentation as such)

D) Language Functions (14 hrs)
  • Reporting the conversation of others
  • Using the third conditional
  • Expressing agreement and disagreement
  • Numerical expressions
  • Describing manner and frequency
  • Evaluating different standpoints
  • Developing an argument
  • Describing daily routines, events, and weather

D) Seminar presentation on the themes allotted using power point frames (14 hrs)

PROCEDURE:
A) Phonetic practice
The learners should be given drills in the pronunciation of at least 30 words for each sound. While practicing stress patterns, they should be encouraged to identify as many words as possible for each pattern.

B) Speech practice
Every student should be allowed to choose one theme to specialize in. (However not more than 7 students in a section can choose the same theme). The teacher has to prepare at least 4 hints development tasks on each theme and should provide chance to each learner to speak on those hints related to his/ her theme (5 minutes). The hints may be supplied to the students in advance. When a student speaks, the class should be encouraged to ask questions as well as note down the words related to the different fields.

C) Language Functions
The teacher should build micro activities to develop the use of language required to handle these sub-functions of communication. In the process, the learners should get used to the linguistic elements needed for these functions.

D) Seminar presentation on the themes allotted
Each student should collect materials from books, journals and newspapers for his/her theme and prepare a short seminar paper. The presentation should be for 10 minutes using power point frames. It should be followed by an ‘open house’ during which others should come forward to question, clarify, supplement or evaluate.

RECORD LAYOUT:
Every student has to maintain a record in which he/she has to incorporate the following details.
1. First page containing learner details and the topic of specialization.
2. Twenty words for each phoneme /æ/, /ei/, /i/ and /e/.
3. Fifty words with first syllable stress and fifty for second syllable stress (The learner will be required to pronounce some of these words during the practical exam).
4. Vocabulary list (technical words and compound words) related to the 10 themes identified for this semester.
5. Three newspaper items, two journal items and three internet sources related to the special theme selected by the student. (To be pasted on the pages)
6. The seminar paper presented by the learner with a soft copy of the power point frames.
7. Notes of observation. (Details about any two seminar paper presentations by others)
8. The record should be duly signed by the course teacher and submitted to the External Examiner for verification during the semester practicals.

P = 45 Total = 45
BEC501 DIGITAL COMMUNICATION

OBJECTIVES

- To study signal space representation of signals and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals.
- To understand base band and band pass signal transmission and reception techniques.
- To learn error control coding which encompasses techniques for the encoding and decoding of digital data streams for their reliable transmission over noisy channels.

UNIT I DIGITAL COMMUNICATION SYSTEM


UNIT II BASEBAND FORMATTING TECHNIQUES


UNIT III CHANNEL CODING TECHNIQUES AND LINE CODES

Error Control Codes - Block Codes, Convolutional Codes, Concept of Error Free Communication; Classification of line codes, desirable characteristics and power spectra of line codes.

UNIT IV BASEBAND RECEPTION TECHNIQUES

Noise in Communication Systems; Receiving Filter – Correlator type, Matched Filter type; Equalizing Filter - Signal and system design for ISI elimination, Implementation, Eye Pattern analysis; Synchronization; Detector – Maximum Likelihood Detector, Error Probability, Figure-of-Merit for Digital Detection.

UNIT V BANDPASS SIGNAL TRANSMISSION AND RECEPTION

Memory less modulation methods - Representation and Spectral characteristics, Binary ASK, Binary PSK, Binary FSK, QAM, QPSK; Band pass receiving filter, Error performance – Coherent and Non-coherent detection systems.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC502       DSP FOR COMMUNICATION ENGINEERING

OBJECTIVES

- To study DFT and its computation
- To study the design techniques for digital filters
- To study the finite word length effects in signal processing
- To study the applications of digital signal processing.

UNIT I       DISCRETE FOURIER TRANSFORM

DTFT and its properties, DFT and its properties, Relation between DTFT and DFT, FFT computations using Decimation in time and Decimation in frequency algorithms, Inverse DFT using FFT algorithms, Use of FFT in linear filtering, Sectionalized convolution-overlap add and save procedure.

UNIT II      INFINITE IMPULSE RESPONSE DIGITAL FILTERS


UNIT III     FINITE IMPULSE RESPONSE DIGITAL FILTERS


UNIT IV      FINITE WORD LENGTH EFFECTS

Fixed point and floating point number representations - Comparison - Truncation and Rounding errors - Quantization noise - derivation for quantization noise power - coefficient quantization error - Product quantization error - Overflow error - Roundoff noise power - limit cycle oscillations due to product round off and overflow errors - signal scaling

UNIT V       DIGITAL SIGNAL PROCESSORS


TUTORIAL: 15 PERIODS

TOTAL: 60 PERIODS

TEXT BOOKS


REFERENCES

BEC503  MICROPROCESSORS AND MICROCONTROLLER  L  T  P  C  
3  0  0  3

OBJECTIVES
- To introduce the architecture and programming of 8085 microprocessor.
- To introduce the interfacing of peripheral devices with 8085 microprocessor.
- To introduce the architecture, programming and interfacing of 8051 microcontroller.

UNIT I  INTRODUCTION  9
Introduction to 8085 microprocessor architecture-Memory Interfacing-I/O Data transfer concepts-Addressing modes-Timing diagram-Interrupts system-Instruction set-Simple programming in 8085, Architecture of 8086

UNIT II  MICROPROCESSOR PERIPHERAL INTERFACING  9
Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Programmable Keyboard & display (8279), Programmable Interval timers (Intel 8253), UART (8251), D-to-A converter, A-to-D converter.

UNIT III  8051 MICROCONTROLLER  9
Introduction to 8051 Microcontroller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Interrupts.

UNIT IV  8051 PROGRAMMING  9
Programmer’s model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Programming.

UNIT V  SYSTEM DESIGN USING 8051  9
Traffic light control, washing machine control, RTC Interfacing using I²C Standard- Motor Control using Relay, PWM, DC & Stepper Motor control, Electronic lock system.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC504  TRANSMISSION LINES AND WAVEGUIDES  L  T  P  C
3  0  0  3

OBJECTIVES
• To become familiar with propagation of signals through lines
• To understand signal propagation at radio frequencies
• To understand radio propagation in guided systems
• To become familiar with resonators

UNIT I  LUMPED FILTERS 9
The neper - the decibel - Characteristic impedance of Symmetrical Networks – Current and voltage ratios - Propagation constant, Properties of Symmetrical Networks - Filter fundamentals – Low pass, High pass, band pass, band elimination filters and Constant K Filters - Behaviour of the Characteristic impedance- m - derived sections - Filter circuit design - Filter performance - Crystal Filters.

UNIT II  TRANSMISSION LINE PARAMETERS 9
A line of cascaded T sections - Transmission lines - General Solution, Physical Significance of the equations, the infinite line, wavelength, velocity, propagation, Distortion line, coaxial cable, Reflection on a line not terminated in \( Z_\infty \), Reflection Coefficient, Open and short circuited lines, Insertion loss.

UNIT III  THE LINE AT RADIO FREQUENCY 9
Parameters of open wire line and Coaxial cable at RF - Line constants for dissipation - voltages and currents on the dissipationless line - standing waves - nodes - standing wave ratio - input impedance of open and short circuited lines - power and impedance measurement on lines – \( \lambda/4 \) line, Impedance matching - single and double-stub matching, circle diagram, smith chart and its applications - Problem solving using Smith chart.

UNIT IV  GUIDED WAVES BETWEEN PARALLEL PLANES 9
Application of the restrictions to Maxwell's equations - transmission of TM, TE and TEM waves between Parallel planes - wave propagation - Velocities of the waves - characteristic impedance – Attenuators.

UNIT V  WAVEGUIDES 9
Application of Maxwell's equations to the rectangular waveguide – TM and TE waves in Rectangular guide - Cylindrical waveguides - The TEM wave in coaxial lines - Excitation of wave guides - Guide termination and resonant cavities.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BE1505  ELECTRONIC INSTRUMENTATION AND MEASUREMENTS

OBJECTIVES:
- To study the principles and concepts of electronic measurements.
- To acquire the knowledge about signal generators and signal analyzers in measurements.
- To understand the relevance of digital instruments in measurements.
- To learn the needs for data acquisition systems and measurement techniques in optical domain.

UNIT I  BASIC MEASUREMENT CONCEPTS  9
Measurement systems - Static and dynamic characteristics - Units and Standards of measurements - Error analysis - Moving coil, Moving iron meters - Multimeters - True RMS Meters - Bridge measurements - Maxwell, Hay, Schering, Anderson and Wien bridge.

UNIT II  BASIC ELECTRONIC MEASUREMENTS  9
Electronic multimeters - Cathode ray oscilloscope - Block schematic - Applications-Special oscilloscopes - Q meters - Vector meters - RF voltage and power measurements.

UNIT III  SIGNAL GENERATORS AND ANALYZERS  9
Function generators - RF Signal generators - Sweep generators - Frequency synthesizer - Wave analyzer - Harmonic distortion analyzer - Spectrum analyzer.

UNIT IV  DIGITAL INSTRUMENTS  9
Digital voltmeter – Multimeters - Frequency counters - Measurement of frequency and time interval - Extension of frequency range - Measurement errors - Recording and Display devices

UNIT V  DATA ACQUISITION SYSTEMS AND FIBER OPTIC MEASUREMENTS  9
Elements of a digital data acquisition system-Interfacing of transducers Multiplexing computer controlled instrumentation- IEEE 488 bus-Localization of cable faults-Fiber optic measurements for power and system loss-Optical time domains reflectometer.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC531  COMMUNICATION ENGINEERING LABORATORY  

**List of Experiments**

1. Study of AM modulator & determination of percentage of modulation
2. Study of FM modulator & to determine the modulation index and bandwidth for various values of amplitude and frequency signals.
3. Study and verification of Frequency Division Multiplexing and Time Division Multiplexing.
4. Study of Pulse Modulation- PAM/PWM/PPM using discrete components / simulation using LABVIEW.
5. Study of Digital Modulation schemes – ASK, PSK, QPSK, and FSK using discrete components / simulation using LABVIEW.
6. Study and simulation of Line codes and Error control coding techniques using LABVIEW.
7. Verification of Sampling Theorem and effects of aliasing using MATLAB.
8. Study and verification of Linear and Circular Convolution using MATLAB.
9. Designing of FIR Filters using MATLAB.
10. Designing of IIR Filters using MATLAB.
11. Calculation of FFT of a signal using MATLAB.
12. Study of Finite Word Length effects using MATLAB.
BEC532  PROCESSORS AND MICROCONTROLLER LABORATORY

List of Experiments
1. Study of various addressing modes using TMS320C50 processor.
2. Implementation of linear & circular convolution using TMS320C64XX/67XX processor.
5. Calculation of FFT using TMS320C64XX/67XX processor.
6. Programs for arithmetic & logical operations using 8085 Microprocessor.
7. Programs for Sorting & Searching using 8085 Microprocessor.
8. Parallel communication between two kits using 8255 interfacing card.
10. Programs for arithmetic & logic operations using 8086 Microprocessor.
11. Interfacing ADC and DAC using 8051 Microcontroller.
BGE501  PROFESSIONAL ETHICS AND HUMAN VALUES  
(Common to 5th Sem - EEE, EIE, CIVIL & IT  
6th Sem - CSE & ECE)  

OBJECTIVES:  
• To create awareness on Engineering Ethics and Human Values.  
• To instill Moral and Social Values and Loyalty  
• To appreciate the rights of others  

UNIT I  HUMAN VALUES  

UNIT II  ENGINEERING ETHICS  

UNIT III  ENGINEERING AS SOCIAL EXPERIMENTATION  
Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study  

UNIT IV  SAFETY, RESPONSIBILITIES AND RIGHTS  

UNIT V  GLOBAL ISSUES  
Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -Moral leadership-sample code of Ethics for ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE),India.  

TOTAL: 45 PERIODS  

TEXT BOOKS  

REFERENCES  
BEC601  COMPUTER ARCHITECTURE AND ORGANIZATION  L  T  P  C
3   0   0   3

OBJECTIVES

• To have a thorough understanding of the basic structure and operation of a digital computer.
• To discuss in detail the operation of the arithmetic unit including the algorithms and implementation of fixed-point and floating-point addition, subtraction, multiplication and division.
• To study in detail the different types of control and the concept of pipelining.
• To study the hierarchical memory system including cache memories and virtual memory.
• To study the different ways to communicate with I/O devices and standard I/O interfaces.

UNIT I  INTRODUCTION  9

UNIT II  DATA PATH DESIGN  9
Addition and subtraction of signed numbers – Design of fast adders – multiplication of positive numbers- signed operand multiplication and fast multiplication – non restoring division algorithm – Combinational ALU - floating point numbers and operations.

UNIT III  BASIC PROCESSING UNIT  9

UNIT IV  MEMORY SYSTEM  9

UNIT V  I/O ORGANIZATION  9

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES
BEC602 COMPUTER COMMUNICATION NETWORKS L T P C
3 0 0 3

OBJECTIVES

- To understand the functions of different layers.
- To introduce IEEE standard employed in computer networking.
- To get familiarized with different protocols and network components.

UNIT I INTRODUCTION TO COMPUTER COMMUNICATION NETWORKS AND PHYSICAL LAYER 9


UNIT II DATA LINK LAYER 10

Multiple access: Random access – Controlled access

UNIT III NETWORK LAYER 9


UNIT IV TRANSPORT LAYER 7


UNIT V APPLICATION LAYER 10


TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

BEC603                                         ANTENNA AND WAVE PROPAGATION             L   T   P   C  
                                                3    0    0    3

OBJECTIVES
- To study radiation from a current element.
- To study antenna arrays
- To study aperture antennas
- To learn special antennas such as frequency independent and broad band antennas.
- To study radio wave propagation.

UNIT I  PHYSICAL CONCEPT OF RADIATION
Basic properties of transmitting and receiving antenna, Friss transmission formula, Antenna parameters: Radiation pattern, Directivity, Gain, Radiation resistance ,Mutual impedance , Input impedance, Polarization, Bandwidth, Beamwidth, Reciprocity principle, Equivalence of Radiation patterns, Equivalence of Impedances, Effective aperture, Vector effective length, Antenna temperature.
Wire antennas: Short dipole, Radiation resistance and Directivity, Half wave Dipole, Monopole, Small loop antennas.

UNIT II  THEORY OF ARRAY ANTENNA
Antenna Arrays: Linear Array and Pattern Multiplication, Two-element Array, Uniform Array, Polynomial representation, Array with non-uniform Excitation-Binomial Array, log-periodic dipole arrays and Yagi-uda arrays.

UNIT III  APERTURE ANTENNAS

UNIT IV  SPECIAL ANTENNAS AND ANTENNA MEASUREMENTS
Antenna Measurements: Radiation Pattern measurement, Gain and Directivity Measurements, Anechoic Chamber.

UNIT V  RADIO WAVE PROPAGATION

TOTAL: 45 PERIODS

TEXTBOOKS
REFERENCES
BEC604  VLSI DESIGN  L  T  P  C
3  1  0  4

OBJECTIVES

• To learn the CMOS process technology.
• To learn techniques of chip design using programmable devices.
• To learn the concepts of designing VLSI subsystems.
• To learn the concepts of modeling a digital system using Hardware Description Language.

UNIT I  CMOS TECHNOLOGY  9
A brief History, MOS transistor, Ideal I-V characteristics, C-V characteristics, Non ideal I-V effects, DC transfer characteristics, CMOS technologies, Layout design Rules, CMOS process enhancements, Technology related CAD issues, Manufacturing issues.

UNIT II  CLASSIFICATION OF ICs AND CIRCUIT CHARACTERIZATION  9
SSI, MSI, LSI, VLSI definitions, ASIC classification, Full Custom ASICs, Standard Cell based ASICs, Gate Array based ASICs, Channelled, channelless and structured GA, Architecture of Generic FPGA. Delay estimation, Logical effort and Transistor sizing, Power dissipation, Interconnect, Design margin, Reliability, Scaling.

UNIT III  COMBINATIONAL AND SEQUENTIAL CIRCUIT DESIGN  9
Circuit families, Low power logic design, comparison of circuit families, sequencing static circuits, circuit design of latches and flip flops, Static sequencing element methodology, sequencing dynamic circuits.

UNIT IV  CMOS TESTING  9
Need for testing, Testers, Text fixtures and test programs, Logic verification, Silicon debug principles, Manufacturing test, Design for testability, Built in Self test, JTAG Boundary scan.

UNIT V  SPECIFICATION USING VERILOG HDL  9
Basic concepts, identifiers, gate primitives, gate delays, operators, timing controls, procedural assignments conditional statements, Data flow and RTL, structural gate level switch level modeling, Design hierarchies, Behavioral and RTL modeling, Test benches, Structural gate level description of decoder, equality detector, comparator, priority encoder, half adder, full adder, Ripple carry adder, Behavioral modeling of ‘n’ bit comparator, D flip-flop, T flip-flop, Structural modeling of Asynchronous counter, shift register, PRBS.

TUTORIAL: 15 PERIODS    LECTURE: 45 PERIODS    TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES

BEC631 COMPUTER COMMUNICATION NETWORKS LABORATORY

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List of Experiments

1. PC to PC Communication / Parallel Communication using 8 bit parallel cable / Serial communication using RS 232C.
2. Analysis of logical link control layer protocols - Stop & wait, Sliding window.
3. Token Ring & Token Bus Protocols.
4. Ethernet LAN protocol / to create scenario and study the performance of CSMA/CD, CSMA/CA protocol ethereal simulation.
5. Switches/Routers.
8. Implementation of Data encryption/decryption.
10. NS-2 based Simulation.
BEC632    VLSI DESIGN LABORATORY    L    T    P    C
0    0    3    2

List of Experiments
1. Design Entry and simulation of combinational logic circuits (8 bit adders, 4 bit multipliers, address decoders, multiplexers), Test bench creation, functional verification, and concepts of concurrent and sequential execution to be highlighted.

2. Design Entry and simulation of sequential logic circuits (counters, PRBS generators, accumulators). Test bench creation, functional verification, and concepts of concurrent and sequential execution to be highlighted.

3. Synthesis, P&R and Post P&R simulation for all the blocks/codes developed in Expt. No. 1 and No. 2 given above. Concepts of FPGA floor plan, critical path, design gate count, I/O configuration and pin assignment to be taught in this experiment.

4. Generation of configuration/fuse files for all the blocks/codes developed as part of Expt.1 and Expt. 2. FPGA devices must be configured and hardware tested for the blocks/codes developed as part of Expt. 1 and Expt. 2. The correctness of the inputs and outputs for each of the blocks must be demonstrated at least on oscilloscopes (logic analyzer preferred).

5. Schematic Entry and SPICE simulation of MOS differential amplifier. Determination of gain, bandwidth, output impedance and CMRR.

6. Layout of a simple CMOS inverter, parasitic extraction and simulation.


8. Automatic layout generation followed by post layout extraction and simulation of the circuit studied in Expt. No.7.
BEC001 MEDICAL ELECTRONICS

OBJECTIVES
• To study the methods of recording various biopotentials
• To study the methods of measuring biochemical and various physiological information
• To understand the working of units which will help to restore normal functioning
• To understand the use of radiation for diagnostic and therapy

UNIT I ELECTRO-PHYSIOLOGY AND BIOPOTENTIAL RECORDING 9
The origin of Biopotentials, biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, EOG – lead systems and recording methods, typical waveforms and signal characteristics, electrical safety, micro shock, macro shock.

UNIT II BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENTS 9
pH, pO₂, pCO₂-measurement, Electrophoresis, colorimeter, photometer, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Blood cell counters.

UNIT III ASSIST DEVICES AND BIO-TELEMETRY 9
Cardiac pacemakers, Fibrillation and Defibrillators, Dialyser, Heart-Lung machine, Biotelemetry, Radiopill. Introduction to Biotelemetry, Physiological Parameters Adaptable to Biotelemetry, Components of a Biotelemetry System, Implantable units, Applications of Telemetry in Patient care.

UNIT IV RADIOLOGICAL EQUIPMENTS 9
Ionizing Radiation, Diagnostic X-ray equipments, Use of Radio isotope in diagnosis, Radiation Therapy.

UNIT V RECENT TRENDS IN MEDICAL INSTRUMENTATION 9
Thermograph, endoscopy unit, Laser in medicine, surgical diathermy, MRI, CT, PET, Ultrasonography

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVES

- To learn the logic devices involved in nano electronics
- To study quantum transport devices
- To study carbon nanotubes and molecular electronics

UNIT I  INTRODUCTION TO NANOTECHNOLOGY  9

UNIT II  FUNDAMENTALS OF NANO ELECTRONICS  9

UNIT III  SILICON MOSFETs & QUANTUM TRANSPORT DEVICES  9
Quantum transport devices based on resonant tunneling:- Electron tunneling – resonant tunneling diodes - resonant tunneling devices; Single electron devices for logic applications :- Single electron devices – applications of single electron devices to logic circuits.

UNIT IV  CARBON NANOTUBES  9

UNIT V  MOLECULAR ELECTRONICS  9
TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES
**BEC003 ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY**

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**OBJECTIVES**

- To understand EMI Sources, EMI problems and their solution methods in PCB level / Subsystem and system level design.
- To measure the emission immunity level from different systems to couple with the prescribed EMC standards.

**UNIT I BASIC CONCEPTS**

Definition of EMI and EMC, Intra and Inter system EMI, Sources and victims of EMI, Conducted and Radiated EMI emission and susceptibility, Transient & ESD, Case Histories, Radiation Hazards to humans.

**UNIT II COUPLING MECHANISM**

Common mode coupling, Differential mode coupling, Common impedance coupling, Ground loop coupling, Field to cable coupling, Cable to cable coupling, Power mains and Power supply coupling.

**UNIT III EMI MITIGATION TECHNIQUES**

Shielding - principle, choice of materials for H, E and free space fields, and thickness, EMI gaskets, Bonding, Grounding - circuits, system and cable grounding, Filtering, Transient EMI control devices and applications, PCB Zoning, Component selection, mounting, trace routing.

**UNIT IV STANDARDS AND REGULATION**

Units of EMI; National and International EMI Standardizing Organizations - IEC, ANSI, FCC, CISPR, BIS, CENELEC; FCC standards; EN Emission and Susceptibility standards and specifications; MIL461E Standards.

**UNIT V EMI TEST METHODS AND INSTRUMENTATION**

EMI test sites - Open area site, TEM cell, Shielded chamber, Shielded Anechoic chamber, EMI test receivers, Spectrum Analyzer, Transient EMI Test wave Simulators, EMI coupling Networks - Line impedance Stabilization Networks, Feed through capacitors, Antennas and factors, Current probes and calibration factor; MIL-STD test methods, Civilian STD Test methods.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**


**REFERENCES**

BEC004  RADAR AND NAVIGATIONAL AIDS  L  T  P  C
3  0  0  3

OBJECTIVES

- To derive and discuss the Range equation and the nature of detection.
- To apply Doppler principle to radars and hence detect moving targets, cluster, also to understand tracking radars.
- To refresh principles of antennas and propagation as related to radars, also study of transmitters and receivers.
- To understand principles of navigation, in addition to approach and landing aids as related to navigation.
- To understand navigation of ships from shore to shore.

UNIT I  INTRODUCTION TO RADAR


UNIT II  MTI AND PULSE DOPPLER RADAR

Introduction to Doppler and MTI Radar- Delay –Line Cancelers- Staggered Pulse Repetition Frequencies –Doppler Filter Banks - Digital MTI Processing - Moving Target Detector - Limitations to MTI Performance - MTI from a Moving Platform (AMIT) - Pulse Doppler Radar – Other Doppler Radar Topics- Tracking with Radar –Monopulse Tracking –Conical Scan and Sequential Lobing - Limitations to Tracking Accuracy - Low-Angle Tracking - Tracking in Range - Other Tracking Radar Topics -Comparison of Trackers - Automatic Tracking with Surveillance Radars (ADT).

UNIT III  DETECTION OF SIGNALS IN NOISE


UNIT IV  NAVIGATION METHODS

Navigation (Loran and Decca) - Loran-A - Loran-A Equipment - Range and precision of Standard Loran - Loran-C - The Decca Navigation System - Decca Receivers - Range and Accuracy of Decca - The Omega System

UNIT V  DME AND TACAN  9

TOTAL: 45 PERIODS

TEXTBOOK

REFERENCES
BEC005 OPEN SOURCE BASED EMBEDDED SYSTEM DESIGN  L  T  P  C
3  0  0  3

OBJECTIVES
- To learn the concepts of embedded system design.
- To study the architecture of OMAP-3 and its peripherals.
- To study embedded system development using crane board.
- To introduce an android application development.
- To introduce Linux device driver development.

UNIT I CONCEPTS OF OPEN SOURCE BASED EMBEDDED SYSTEM  9
Concepts of Embedded Systems - Different types of processors - How and why Linux - Contributing to Open source - General Linux architecture--Device Driver architecture - High level code walk through of Linux kernel - Configuring a Linux kernel - Detailed review of the Linux boot process.

UNIT II OMAP-3 AND CRANE BOARD  9
Introduction to OMAP-3 -Introduction to Crane board - Basic introduction to hardware handling - Crane board and its peripherals - Interfacing external peripherals on Crane board - Basics of reading and understanding a schematic.

UNIT III SYSTEM FIRMWARE FOR CRANE BOARD  9
Configuring and building the system firmware for the Crane board- Using the firmware to boot the Crane board - Simple C application on the Crane board - Interfacing an external peripheral.

UNIT IV CROSS TOOLS AND DEVICE DRIVER DEVELOPMENT  9
Cross Tools and development – Tool chain and their components -Using a cross compiler - Device driver development - Development of a basic driver -Development of a simple character driver.

UNIT V ANDROID APPLICATION DEVELOPMENT  9
Introduction to Android SDK- Development of a simple Android application- Steps involved in bringing up Android on Crane board.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCS035 INTERNET AND JAVA PROGRAMMING  

OBJECTIVES  
- To learn Internet and Internetworking  
- To learn the concepts in WWW, HTML and XML.  
- To learn Java Programming Fundamentals  

UNIT I INTERNET AND INTERNETWORKING  

UNIT II HTML AND XML  

UNIT III WORLD WIDE WEB  
Internet connection concepts - Intranets - Connecting LANs to the Internet - E-Mail concepts - E-Mail security - Reasons to secure the messages - Web Browsers Netscape - Internet Explorer - HTTP Protocol - Website and Webpage design - Web indexes – Search Engines.  

UNIT IV JAVA PROGRAMMING  

UNIT V JAVA CLASSES - INTERFACE AND INHERITANCE  

TEXT BOOKS  

REFERENCES  
BEC006 SPEECH PROCESSING

OBJECTIVES

- To introduce the models for speech production
- To develop time and frequency domain techniques for estimating speech parameters
- To introduce a predictive technique for speech compression
- To understand speech recognition, synthesis and speaker identification.

UNIT I MECHANICS OF SPEECH


UNIT II TIME DOMAIN METHODS FOR SPEECH PROCESSING


UNIT III FREQUENCY DOMAIN METHODS FOR SPEECH PROCESSING


UNIT IV LINEAR PREDICTIVE ANALYSIS OF SPEECH


UNIT V APPLICATION OF SPEECH & AUDIO SIGNAL PROCESSING


TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES


BEC007  FUNDAMENTALS OF DIGITAL IMAGE PROCESSING  L  T  P  C
                                                   3  0  0  3

OBJECTIVES

- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques
- To study image restoration procedures.
- To study the image segmentation and representation techniques.
- To study the image compression procedures.

UNIT I  DIGITAL IMAGE FUNDAMENTALS  9
Elements of digital image processing systems, Vidicon and Digital Camera working principles, Elements of visual perception, brightness, contrast, mach band effect, Color image fundamentals - hue, saturation, RGB, HSI models, Image sampling, Quantization, dither, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT, KLT, SVD.

UNIT II  IMAGE ENHANCEMENT  9
Histogram equalization and specification techniques, Spatial and frequency domain filtering, Spatial averaging, Directional Smoothing, Homomorphic filtering, Color image enhancement.

UNIT III  IMAGE RESTORATION  9

UNIT IV  IMAGE SEGMENTATION  9

UNIT V  IMAGE COMPRESSION  9
Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, Transform coding, JPEG and MPEG Standard.

TOTAL: 45 PERIODS

TEXTBOOKS

REFERENCES
### BEC008 TELECOMMUNICATION SWITCHING AND NETWORKS  

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**OBJECTIVES**

- To introduce digital multiplexing and digital hierarchy namely SONET / SDH.
- To introduce the concepts of space switching, time switching and combination switching, example of a switch namely No.4 ESS Toll switch.
- To introduce the need for network synchronization and study synchronization issues. To outline network control and management issues.
- To study the enhanced local loop systems in digital environment. To introduce ISDN, DSL / ADSL, and fiber optic systems in subscriber loop.
- To introduce statistical modeling of telephone traffic. To study blocking system characteristics and queuing system characteristics.

**UNIT I   EVOLUTION OF TELECOMMUNICATION SWITCHING AND CIRCUITS   6**
Evolution of Public Switched Telecommunication Networks - Strowger exchange, Crossbar exchange, Stored programme exchange - Basic Telecommunication equipments - Telephone handset, Hybrid circuit, Echo suppressors and cancellors, PCM coders, Modems and Relays.

**UNIT II   ELECTRONIC SWITCHING  9**
Circuit Switching, Message switching, Centralized stored programme switching, Time switching, Spare switching, Combination switching – Digital switching system hardware configuration, Switching system software, Organization, Switching system call processing software, Hardware software integration.

**UNIT III   TELECOMMUNICATION SIGNALLING AND TRAFFIC  9**
Channel associated signaling, Common channel signaling, SS7 signaling protocol, SS7 protocol architecture, Concept of Telecommunication traffic, Grade of service, Modeling switching systems, Blocking models and Delay systems.

**UNIT IV   INTEGRATED DIGITAL NETWORKS  9**
Subscriber loop characteristics, Local access wire line and wireless PCM / TDM carrier standards transmission line codes, Digital multiplexing techniques, Synchronous, Asynchronous, Plesiochronous multiplexing techniques, SONET / SDH, Integrated Digital Network (IDN) environment – Principles of Integrated Services Digital Network (ISDN) – Cellular Mobile Communication Principles.

**UNIT V   DATA NETWORKS  12**

**TOTAL: 45 PERIODS**

**TEXT BOOKS**

REFERENCES
OBJECTIVES

• To study about the general microprocessor concept.
• To have knowledge about the background of ARM family specifically ARM Cortex – M3 Processor, Operating Modes, and Instruction set etc.
• To study about the memory systems and debugging strategy of Cortex Processor.

UNIT I MICROPROCESSOR ARCHITECTURE

UNIT II ARM CORTEX – M3 PROCESSOR

UNIT III INSTRUCTION SET

UNIT IV MEMORY SYSTEMS

UNIT V DEBUGGING ARCHITECTURE

TOTAL: 45 PERIODS
TEXT BOOKS

REFERENCES
BCS404 OPERATING SYSTEMS
(Common to 4th Sem – CSE & IT 6th Sem - ECE)

L T P C
3 0 0 3

OBJECTIVES

• To aware about OS services that assist system users
• To expose several aspects of OS design including: process scheduling, synchronization, deadlocks and File systems.
• To become familiar with the kinds of abstractions provided by general purpose OS.
• To learn the internal policies and mechanisms implemented in the kernel part of operating systems.
• To analyze the tradeoffs inherent in operating system design and performances.

UNIT I PROCESSES AND THREADS 9

UNIT II PROCESS SCHEDULING AND SYNCHRONIZATION 10

UNIT III STORAGE MANAGEMENT 9

UNIT IV FILE SYSTEMS 9

UNIT V I/O SYSTEMS 8

TEXT BOOK:
REFERENCES:
BEI005  MICRO ELECTRO MECHANICAL SYSTEMS  L  T  P  C
(Common to EIE & ECE)  3  0  0  3

OBJECTIVES:

• To integrate the knowledge of semiconductors and solid mechanics to fabricate MEMS devices.
• To understand the basics of Microfabrication techniques.
• To identify and understand the various sensors, actuators and different materials used for MEMS
• To study the applications of MEMS

UNIT I  OVERVIEW OF MEMS  9

UNIT II  MICRO FABRICATIONS AND MICROMACHINING  9
Microsystem Design and Fabrication, Microsystem fabrication processes-Photolithography, Ion Implantation, Diffusion, Oxidation, Chemical and Physical Vapor deposition, Deposition by Epitaxy, Etching. Bulk Micro manufacturing, Basic surface micromachining processes, LIGA process.

UNIT III  MICROSENSORS  9
Resonant sensor, Vibratory gyroscope, Capacitive and Piezo Resistive Pressure sensors, Piezo Resistive accelerometer, Acoustic devices and SQUIDs.

UNIT IV  MICROACTUATORS  9
Thermal Actuators - Thermal Sensing and Actuation, Thermal expansion, Thermocouples, Magnetic Actuators – Micromagnetic components, Piezoelectric and resistive actuators.

UNIT V  APPLICATIONS  9
MEMS applications in Automobile, Military, Medical, Consumer, Industry and Space domains

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE301  ENVIRONMENTAL SCIENCE AND ENGINEERING  L T P C
(Common to 3rd Sem – Civil, CSE, IT, EEE and EIE
5th Sem – Mechanical, 7th Sem - ECE)  3 0 0 3

OBJECTIVE
• At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

UNIT I  ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY  14
Definition, scope and importance of environment – need for public awareness – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) –Introduction to biodiversity definition: genetic, species and ecosystem diversity –biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts –endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds. Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II  ENVIRONMENTAL POLLUTION  8
Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III  NATURAL RESOURCES  10
Forest resources: Use and over-exploitation, deforestation, case studies – timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over – utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.
UNIT IV  SOCIA L ISSUES AND THE ENVIRONMENT
From unsustainable to sustainable development – urban problems related to energy – water
conservation, rain water harvesting, watershed management – resettlement and rehabilitation of
people; its problems and concerns, case studies – role of nongovernmental organization –
environmental ethics: Issues and possible solutions – climate change, global warming, acid rain,
ozone layer depletion, nuclear accidents and holocaust, case studies – wasteland reclamation –
consumerism and waste products – environment protection act – Air (Prevention and Control of
Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest
conservation act – enforcement machinery involved in environmental legislation – central and state
pollution control boards- Public awareness.

UNIT V  HUMAN POPULATION AND THE ENVIRONMENT
Population growth, variation among nations – population explosion – family welfare programme –
welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

TEXT BOOKS
2006.

REFERENCES
1. R.K. Trivedi, “Handbook of Environmental Laws, Rules, Guidelines, Compliances and
3. Dharmendra S. Sengar, “Environmental Law”, Prentice Hall of India (P) Ltd., New Delhi,
2007.
OBJECTIVES

- To characterize fading multi-path radio channels in terms of Doppler spectrum, coherence time, power delay profile and coherence bandwidth.
- To distinguish the difference large signal fading and small signal fading.
- To plan and analyze simple wireless networks in terms of coverage and capacity.

UNIT I  INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS 9

UNIT II  MOBILE RADIO WAVE PROPAGATION - LARGE SCALE FADING 9

UNIT III  MOBILE RADIO WAVE PROPAGATION - SMALL SCALE FADING AND MULTIPATH 9

UNIT IV  DIVERSITY AND EQUALIZATION IN WIRELESS SYSTEM 9

UNIT V  WIRELESS SYSTEMS AND STANDARDS 9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCE
BEC702  OPTICAL COMMUNICATION AND NETWORKS  L T P C
                                           3 0 0 3

OBJECTIVES

• To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
• To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors. Design optimization of SM fibers, RI profile and cut-off wave length.
• To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes and different fiber amplifiers.
• To learn the fiber optical receivers such as PIN, APD diodes, receiver operation and configuration.
• To learn operational principles of WDM and Solitons.

UNIT I  INTRODUCTION  9

UNIT II  TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS  9

UNIT III  OPTICAL SOURCES AND RECEIVERS  9
Optical sources: Light Emitting Diodes - LED structures - surface and edge emitters, mono and hetero structures - quantum efficiency, injection laser diode - ILD structures - comparison of LED and ILD.
Optical Detectors: PIN Photo detectors, Avalanche photo diodes, construction, characteristics and properties, Comparison of performance, Fundamental receiver operation, Pre amplifiers, Error sources, Receiver Configuration.

UNIT IV  FIBER OPTIC MEASUREMENTS  9

UNIT V  OPTICAL NETWORKS  9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC703 RF AND MICROWAVE ENGINEERING L T P C

3 0 0 3

OBJECTIVES
To understand and gain complete knowledge about
- RF basic concepts.
- RF amplifier design.
- Microwave semiconductor devices
- Microwave passive components
- Microwave measurements
- MMIC technology

UNIT I TWO PORT RF NETWORKS-CIRCUIT REPRESENTATION
Low frequency parameters- impedance, admittance, hybrid and ABCD. High frequency parameters-Formulation of S parameters, properties of S parameters-Reciprocal and lossless networks, transmission matrix, Scattering matrix -Concept of N port scattering matrix representation-Properties of S matrix- S matrix formulation of two-port junction Introduction to component basics - wire, resistor, capacitor and inductor - applications of RF

UNIT II RF TRANSISTOR AMPLIFIER DESIGN AND MMIC TECHNOLOGY
Amplifier power relation, stability considerations, gain considerations, noise figure, Parametric devices -Principles of operation - applications of parametric amplifier, Microwave monolithic integrated circuit (MMIC) - Materials and fabrication techniques.

UNIT III MICROWAVE PASSIVE COMPONENTS
Microwave frequency range, significance of microwave frequency range -. Microwave junctions - Tee junctions- E plane tee- H plane Tee-Magic Tee - Rat race - Corners -bends and twists - Directional couplers -two hole directional couplers- Ferrites -Gyrator- Isolator-Circulator - Attenuator - Phase changer.

UNIT IV MICROWAVE SEMICONDUCTOR DEVICES
Microwave semiconductor devices- operation - characteristics and application of BJTs and FETs- MESFET, HEMT -Principles of tunnel diodes - Varactor and Step recovery diodes, Transferred Electron Devices -Gunn diode- Avalanche Transit time devices- IMPATT and TRAPATT devices.

UNIT V MICROWAVE TUBES AND MEASUREMENTS
Microwave tubes- High frequency limitations – Principle of operation of Two cavity and four cavity Klystron, Reflex Klystron, Traveling Wave Tube, and Magnetron. Microwave measurements -power, wavelength, impedance, SWR, attenuation, Q factor and Phase shift.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC731 ELECTRONIC SYSTEM DESIGN LABORATORY L T P C
0 0 3 2

OBJECTIVES
- To design and develop a simple Electronic systems based on Microprocessor, Microcontroller, FPGA and discrete IC’s

LIST OF EXPERIMENTS
1. Design of a 4-20mA transmitter for a bridge type transducer. Design the Instrumentation amplifier with the bridge type transducer (Thermistor or any resistance variation transducers) and convert the amplified voltage from the instrumentation amplifier to 4 – 20 mA current using op-amp. Plot the variation of the temperature Vs output current.
2. Design of process control timer. Design a sequential timer to switch on & off at least 3 relays in a particular sequence using timer IC.
3. Design of Wireless data modem using FSK modulator
4. PCB layout design using CAD. Drawing the schematic of simple electronic circuit and design of PCB layout using CAD
5. Microcontroller based systems design. Design of microcontroller based system for simple applications like security systems combination lock and advertisement display.
6. DSP based system design. Design a DSP based system for echo cancellation, using TMS/ADSP DSP kit.
7. Pseudo-random Sequence Generator
8. Design of a simple 4 bit processor on FPGA.
9. Design and implementation of Encoder and Decoder for Linear Block Code and Cyclic code.
10. Design and Implementation of FIR filter on FPGA.
11. Implementation of RS-232 serial communication protocol on FPGA.

TOTAL: 45 PERIODS
BEC732  OPTICAL AND MICROWAVE LABORATORY  

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**OBJECTIVES**
- To measure various parameters of microwave components and fiber optic cables.
- To study the characteristics of LED, Photodiode through fiber optic cable.

**LIST OF EXPERIMENTS**
Experiments pertaining to Fiber optics, Optical Communication and Fiber optic sensors:
1. Numerical aperture determination for fibers and Attenuation Measurement in Fibers.
2. Attenuation Measurement in Fibers.
3. Fiber optic analog communication links.
4. Fiber optic digital communication links.
5. LED & Photo Diode Characteristics.

Microwave experiments:
1. Study of Microwave components
2. VSWR Measurements – Determination of terminated impedance.
3. Determination of guide wavelength, frequency measurement.
4. Radiation Pattern of Horn antenna
5. Determination of S-Matrix for microwave tees
6. Performance measure of Directional coupler

TOTAL: 45 PERIODS
BEC733  COMPREHENSION

OBJECTIVES
- To encourage the students to pursue their higher education.
- To prepare the students to undergo GATE like entrance exams.
- To evaluate the comprehensive knowledge being acquired by the student.

COURSE CONTENT AND LAYOUT
The students will select a particular group of subjects as mentioned below to review their competency level:

Group A
1. Circuit Theory
2. Analog and Digital Circuits
3. Control Systems
4. Analog and Digital Communication
5. Signals and Systems

Group B
1. Digital Circuits and Microprocessor
2. Computer Networks
3. VLSI Design
4. Data Structures and OOPS
5. Communication Skills

- The staff-coordinator per group is responsible for scheduling the session plans, monitoring the activities and recording the continual assessments.
- The technical seminars and group discussions will be assisted by subject experts in the department.
- Each student must participate in all the activities and their performance assessment must be recorded.

SUGGESTED ACTIVITIES
- Group Discussion
- Technical Seminars
- Objective type test solving skills
- Mock GATE Examination
- Comprehensive Viva

TOTAL: 45 PERIODS
BMG601  PRINCIPLES OF MANAGEMENT  L T P C
3  0  0  3

OBJECTIVES
• To get the skills needed to successfully manage an organization.
• To understand concepts of strategic and tactical organizational planning.
• Implement employee motivational approaches and conflict management skills.
• To describe common performance appraisal processes.
• To understand group and team management, management development, and employee training.
• Describe concepts of controlling and control systems.

UNIT I  FOUNDATIONS
Historical developments – approaches to management – Management and Administration –
Development of Management Thought – Contribution of Taylor and Fayol – Functions of
Management – Types of Business Organization, Meaning, features merits and demerits.

UNIT II  MANAGERS AND ENVIRONMENT
Social responsibility – Planning – Objectives – Setting Objectives – Process of Managing through

UNIT III  FUNCTIONAL AREA OF ORGANISATION
Formal and informal organization – Organization Chart – Structure and Process – Departmentation by
different strategies – Line and Staff authority – Benefits and Limitations – De-Centralization and
Effectiveness.

UNIT IV  MOTIVATION AND DIRECTIONS
Objectives– Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership –
Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational
Techniques – Job Enrichment – Communication.

UNIT V  CONTROLLING STRATEGIES
System and process of Controlling – Requirements for effective control – The Budget as Control
Technique – Information Technology– Computers in handling the information – Productivity –
Problems and Management – Control of Overall Performance – Direct and Preventive Control –
and Global theory of Management.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
2. Charles W.L Hill, Steven L McShane, “Principles of Management”, Mcgraw Hill Education,
BEC801 SATELLITE COMMUNICATION SYSTEMS L T P C
3 0 0 3

OBJECTIVES
- Study of satellite orbits and launching.
- Study of earth segment and space segment components
- Study of satellite link design.

UNIT I SATELLITE ORBITS
9
Kepler's Laws, Newton's laws, orbital parameters, orbital perturbations, station keeping, geo stationary and non-Geo-stationary orbits - Look Angle Determination- Limits of visibility eclipse-Sub satellite point -Sun transit outage.

UNIT II SPACE SEGMENT AND LAUNCH VEHICLES
9
Launching Procedures, Hohmann Transfer, Different Launch Vehicles, Spacecraft Technology-Structure, Primary power, Attitude and Orbit control, Telemetry, Tracking and command. Thermal control and Propulsion, Communication, Payload and supporting subsystems.

UNIT III SATELLITE LINK DESIGN
9
Satellite uplink and downlink Analysis and Design, link budget, C/N calculation, performance impairments-system noise, inter modulation interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

UNIT IV EARTH SEGMENT
9
Earth Station Technology - Terrestrial Interface, Transmitter and Receiver, Antenna Systems, DBS, DTH, TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/N0, EIRP, Antenna Gain.

UNIT V SATELLITE APPLICATIONS
9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC010  VLSI DIGITAL SIGNAL PROCESSING  

OBJECTIVES
- To study the concepts of pipelining, parallel processing.
- To learn the methods for designing a rank order filter.
- To know the algorithms for IIR filter design.

UNIT I  DSP SYSTEMS, PIPELINING AND PARALLEL PROCESSING  
Introduction – Representations of DSP algorithms - Iteration Bound - data flow graph representations, loop bound and iteration bound, Longest path Matrix algorithm; Pipelining and parallel processing - Pipelining of FIR digital filters, parallel processing, pipelining and parallel processing for low power.

UNIT II  RETIMING, UNFOLDING AND RANK ORDER FILTERS  
Retiming - definitions and properties; Unfolding - an algorithm for Unfolding, properties of unfolding, parallel processing application; Algorithmic strength reduction in filters and transforms - 2-parallel FIR filter, 2-parallel fast FIR filter, parallel architectures for rank-order filters, Odd- Even Merge-Sort architecture, parallel rank-order filters.

UNIT III  FAST CONVOLUTION, PIPELINING AND PARALLEL PROCESSING OF IIR FILTERS  
Fast convolution - Cook-Toom algorithm, modified Cook-Toom algorithm; Pipelined and parallel recursive filters - inefficient/efficient single channel interleaving, Look Ahead pipelining in first-order IIR filters, Look-Ahead pipelining with power-of-two decomposition, Clustered Look-Ahead pipelining, parallel processing of IIR filters, combined pipelining and parallel processing of IIR filters.

UNIT IV  ROUNDOFF NOISE AND BIT-LEVEL ARITHMETIC ARCHITECTURES  
Scaling and roundoff noise- scaling operation, roundoff noise, state variable description of digital filters, scaling and roundoff noise computation, roundoff noise in pipelined first-order IIR filters; Bit-Level Arithmetic Architectures- parallel multipliers with sign extension, parallel carry-ripple array multipliers, parallel carry-save multiplier, 4x 4 bit Baugh-Wooley carry-save multiplication, design of Lyon's bit-serial multipliers using Horner's rule.

UNIT V  NUMERICAL STRENGTH REDUCTION AND WAVE PIPELINING  
Numerical Strength Reduction - subexpression elimination, multiple constant multiplications, iterative matching, Two-phase clock generator, clock skew in edge triggered single-phase clocking, two-phase clocking, wave pipelining.

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
BEC011 ADVANCED VLSI DESIGN  L T P C
3 0 0 3

OBJECTIVES
- To learn the programmable ASIC logic cells, I/O cells.
- To know the ASIC interconnects and Design Software.
- To study the ASIC construction, design entry.

UNIT I INTRODUCTION TO ASICS, CMOS LOGIC AND ASIC LIBRARY DESIGN 9
Types of ASICs - Design flow - CMOS transistors - Combinational Logic Cell - Sequential logic cell - Data path logic cell - Transistors as Resistors - Transistor Parasitic Capacitance- Logical effort - Library cell design - Library architecture.

UNIT II PROGRAMMABLE ASICS, PROGRAMMABLE ASIC LOGIC CELLS AND PROGRAMMABLE ASIC I/O CELLS 9
Anti fuse - static RAM - EPROM and EEPROM technology - PREP benchmarks - Actel ACT - Xilinx LCA - Altera FLEX - Altera MAX - DC & AC inputs and outputs - Clock & Power inputs - Xilinx I/O blocks.

UNIT III PROGRAMMABLE ASIC INTERCONNECT AND PROGRAMMABLE ASIC DESIGN SOFTWARE 9
Actel ACT - Xilinx LCA - Xilinx EPLD - Altera MAX 5000 and 7000 - Altera MAX 9000 - Altera FLEX - Design systems - Logic Synthesis - Half gate ASIC.

UNIT IV LOW LEVEL DESIGN ENTRY, LOGIC SYNTHESIS AND SIMULATION 9
Schematic entry - Low level design language - PLA tools – EDIF - CFI design representation- Logic synthesis - Definition - A Logic synthesis example (Verilog) - Types of Simulation (definitions only).

UNIT V ASIC CONSTRUCTION, FLOOR PLANNING, PLACEMENT AND ROUTING 9
System Partitioning - Objectives of Partitioning - A Simple Partitioning example; Floor planning - Goals and Objectives - Measurement of Delay in floor planning - Channel definition - I/O and Power Planning - Clock Planning; Placement - Terms and definitions - Goals and Objectives - an example with simple placement - physical design flow; Global routing - Objectives and methods - Detailed routing - Objectives - Detailed routing with left edge algorithm - Special routing - Circuit extraction and DRC.

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
BEC012  FUNDAMENTALS OF SEMICONDUCTOR CHIP TESTING  L  T  P  C
3  0  0  3

OBJECTIVES

• To understand the methodology of IC manufacturing
• To familiarize the fundamentals of IC testing

UNIT I  INTRODUCTION TO SEMICONDUCTOR IC TESTING  9
Manufacturing defects in an IC – Need for CHIP testing – Types of Chip testing – Engineering
testing, production testing, QA testing, Customer inspection testing. ATE – Automated Test
Equipment and its components – digital subsystem analog subsystem – mixed signal subsystem –
ATE subsystems – Test head, Main frame, Test computer, Manipulator. Common accessories of an
ATE – Load boards, Probe cards.

UNIT II  DIGITAL DOMAIN TESTING – CONCEPTS AND METHODS  9
Introduction to testing in digital domains – Functional Testing Basics – VIL/VIH, VOL/VOH, IIL,
IIH, IOL, IOH – DC Parametric test, continuity test, leakage test, IDD static test, IDD dynamic
test, Digital Functional Test – Pattern, Timing, Levels – IO Signals – Input Signal Generation,
Output Signal Compare Test Vectors – BIST, MBIST, PBIST techniques. AC Parameters Test –
AC Timing Tests – Setup Time, Hold Time, Propagation Delay, ATE Time Measurement
subsystem, Timing Calibration – JTAG Standard for testing at board level.

UNIT III  AUTOMATIC TEST EQUIPMENT ARCHITECTURE  9
Architecture of a mixed signal ATE – DC Subsystem, Digital subsystem, Clock, DSP, VI Source,
DC Matrix, Waveform generators. Digital subsystem – Drivers, Comparators, PMU, Timing and
formatting units, Sequence controller, Digital source memory, digital capture memory, ATE Pin
Electronics.

UNIT IV  TESTING OF SEMICONDUCTOR DEVICES  9
Project Plan, Specifications and Test Program. Test Plan Specifications – Sample Test Program –
types, Considerations, Test Flow, Binning. Common Categories of Test for Semiconductor
Devices – Continuity Test, leakage test, IDD test, DC test, Functional, AC tests, Specifications of
Devices – Data Sheets.

UNIT V  CAD TOOLS FOR TESTING  9
Debug Tools and data analysis, Characterization methods – Tools – Datalog, Histogram, Shmoo,
pin margin, Pattern debugger, Waveform tool. Trouble Shooting Techniques – Statistical process
control, process capability (CP), Process capability index (CPK), Standard deviation, mean, guard
banding, Gaussian statistics.

TOTAL: 45 PERIODS

TEXT BOOKS
1. Mark burns & Gordon W Roberts, “An Introduction to mixed signal IC testing and
academic publishers, 2000.

REFERENCES
1. “A Text book on semiconductor IC testing using Automatic Test Equipment”, Tessolve
Services – Private circulation manual.
2. William J. Greig, “Integrated Circuit Packaging, Assembly and Interconnections”,
OBJECTIVES

- Understand the fundamentals of fixed and floating point architectures of various DSPs.
- Learn the design of DSP Processors and its internal architecture.
- Study the recent trends in DSP system design.

UNIT I COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS 9
Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT II ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES 9
Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT III PROGRAMMABLE DIGITAL SIGNAL PROCESSORS 9
Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX Processors, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline operation of TMS320C54XX Processors.

UNIT IV ARCHITECTURE OF ‘C6X PROCESSORS 9
Features of ‘C6x Processors – Internal Architecture – General purpose register files – Functional units and its instructions – data paths – Fixed point instructions – Conditional operations – Parallel operation – Floating point instructions – Pipeline operations – Application Programs

UNIT V RECENT TRENDS IN DSP SYSTEM DESIGN 9
An overview of Open Multimedia Applications Platform(OMAP) – Evolution of FPGA based system design – Softcore Processors – FPGAs in Telecommunication Applications

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC014  ARM PROCESSOR ARCHITECTURE AND PROGRAMMING  L  T  P  C
3  0  0  3

OBJECTIVES
• To study the fundamental concepts and instruction set of ARM processor.
• To design ARM based serial Interfacing system.
• To learn about various families of ARM processor.

UNIT I  ARM PROCESSOR FUNDAMENTALS  9

UNIT II  ARM INSTRUCTION SET  9
Data Processing Instructions, MOVE Instructions, Barrel Shifter Operations, Arithmetic Instructions, Logical Instructions, Comparison and Test Instructions, Multiply Instructions, Branch Instructions, Load – Store Instructions, Single Register Transfer, Single Register Load Store Addressing Modes, Multiple Register Transfer, Addressing Modes for Stack Operations, Swap Instruction, Software Interrupt Instruction, PSR, MRS and MSR Instructions, Coprocessor Instructions.

UNIT III  ARM ASSEMBLY PROGRAMMING  9

UNIT IV  EXCEPTION AND INTERRUPT HANDLING  9
Exception Handling, ARM Processor Exceptions and Modes, Exception Priorities, Link Register Offsets, Interrupts, Interrupt Latency, Vector table, Basic Interrupt Stack Design and Implementation, Nested Vector interrupt controller of Cortex M3 Processor.

UNIT V  ARM INTERFACING APPLICATIONS  9
ARM – GSM Interfacing, ARM – ZigBee Interfacing, ARM – Motor Interfacing, ARM – Display Interfacing, ARM- Keypad Interfacing, ARM – Sensor Interfacing (Ultrasound, Temperature, Piezoelectric & Pressure)

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCE
BEC015 MULTIMEDIA COMPRESSION AND COMMUNICATION  

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OBJECTIVES

- To have a complete understanding of error–control coding.
- To understand encoding and decoding of digital data streams.
- To introduce methods for the generation of these codes and their decoding techniques.
- To have a detailed knowledge of compression and decompression techniques.
- To introduce the concepts of multimedia communication.

UNIT I MULTIMEDIA COMPONENTS  
Introduction, Multimedia skills, Multimedia components and their characteristics, Text, sound, images, graphics, animation, video, hardware.

UNIT II AUDIO AND VIDEO COMPRESSION  
Audio compression, DPCM, Adaptive PCM, adaptive predictive coding, linear Predictive coding, code excited LPC, perpetual coding, Video compression principles, H.261, H.263, MPEG 1, 2, 4.

UNIT III TEXT AND IMAGE COMPRESSION  
Compression principles, source encoders and destination encoders, lossless and lossy compression, entropy encoding, source encoding, text compression, static Huffman coding, dynamic coding, arithmetic coding, Lempel ziv-welch Compression, Image compression – JPEG Standard, JPEG 2000 Standard, EZW, SPIHT.

UNIT IV VoIP TECHNOLOGY  
Basics of IP transport, VoIP challenges, H.323/ SIP, Network Architecture, Protocols, Call establishment and release, VoIP and SS7, Quality of Service, CODEC Methods, VOIP applicability

UNIT V MULTIMEDIA NETWORKING  
Multimedia networking, Applications, Streamed stored video and audio, Making the best Effort service, Protocols for real time interactive Applications, Distributing multimedia, Beyond best effort service, Scheduling and policing Mechanisms, Integrated services, Differentiated Services, RSVP.

TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

BEC016 INFORMATION THEORY AND CODING TECHNIQUES

OBJECTIVES

• To acquire knowledge about information and entropy.
• To learn about syndrome calculation and design of an encoder and decoder
• To gain knowledge about convolution coding and Viterbi algorithm

UNIT I INFORMATION THEORY

Information theory – Concept of amount of information - units, Entropy - marginal, conditional and joint entropies -relation among entropies and Mutual information, information rate, channel capacity, redundancy and efficiency of channels. Discrete channels – Symmetric channels, Binary Symmetric Channel, Binary Erasure Channel, Cascaded channels, repetition of symbols, Binary asymmetric channel and Shannon theorem. Continuous channels – Capacity of band limited Gaussian channels, Shannon-Hartley theorem, Tradeoff between band width and signal to noise ratio, Capacity of a channel with infinite band width, Optimum modulation system.

UNIT II SOURCE CODING

Coding efficiency and redundancy, Noiseless coding theorem. Construction of basic source codes, Arithmetic coding, LZW algorithm, Audio- Psychoacoustic model, Speech-Linear Predictive Coding

UNIT III SOURCE CODING APPLICATION


UNIT IV ERROR CONTROL CODING: BLOCK CODES

Codes for error detection and correction – Parity check coding, Linear block codes, Error detecting and correcting capabilities, Generator and Parity check matrices, Standard array and Syndrome decoding, Hamming codes, Encoding and decoding of systematic and unsystematic codes. Cyclic codes – Generator polynomial, Generator and Parity check matrices, Encoding of cyclic codes, Syndrome computation and error detection, Decoding of cyclic codes, BCH codes, RS codes, Burst error correction.

UNIT V ERROR CONTROL CODING: CONVOLUTIONAL CODES


TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

BIT008  WIRELESS SENSOR NETWORKS  L T P C
( Common to IT & ECE)  3 0 0 3

OBJECTIVES
- To understand the basics of Sensor Networks.
- To learn various fundamental and emerging protocols of all layers.
- To study about the issues pertaining to major obstacles in establishment and efficient management of sensor networks.
- To demonstrate the nature and applications sensor networks.

UNIT I  INTRODUCTION  9
Challenges for wireless sensor networks, Comparison of sensor network with ad hoc network, Single node architecture – Hardware components, energy consumption of sensor nodes, Network architecture – Sensor network scenarios, types of sources and sinks, single hop versus multi-hop networks, multiple sinks and sources, design principles, Development of wireless sensor networks.

UNIT II  PHYSICAL LAYER  9
Introduction, wireless channel and communication fundamentals – frequency allocation, modulation and demodulation, wave propagation effects and noise, channels models, spread spectrum communication, packet transmission and synchronization, quality of wireless channels and measures for improvement, physical layer and transceiver design consideration in wireless sensor networks, Energy usage profile, choice of modulation, Power Management.

UNIT III  DATALINK LAYER  9
MAC protocols – fundamentals of wireless MAC protocols, low duty cycle protocols and wakeup concepts, contention-based protocols, Schedule-based protocols - SMAC, BMAC, Traffic-adaptive medium access protocol (TRAMA), Link Layer protocols – fundamentals task and requirements, errorcontrol,framing, link management.

UNIT IV  NETWORK LAYER  9

UNIT V  CASE STUDY  9
Target detection tracking, Habitat monitoring, Environmental disaster monitoring, Practical implementation issues, IEEE 802.15.4 low rate WPAN, Operating System Design Issues, Introduction to TinyOS – NesC, Interfaces, modules, configuration, Programming in TinyOS using NesC, Emulator TOSSIM.

TOTAL: 45 PERIODS

TEXT BOOKS
REFERENCES

BMG002 ENTREPRENEURSHIP DEVELOPMENT L T P C 3 0 0 3

OBJECTIVE
• To develop the entrepreneurship potential by providing requisite skills and knowledge to Start a successful business enterprise.

UNIT I ENTREPRENEURSHIP 9

UNIT II MOTIVATION 9
Major Motives Influencing an Entrepreneur – Achievement Motivation Training, self-Rating, Business Game, Thematic Apperception Test – Stress management, Entrepreneurship Development Programs – Need, Objectives.

UNIT III BUSINESS 9

UNIT IV FINANCING AND ACCOUNTING 9

UNIT V SUPPORT TO ENTREPRENEURS 9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC017  WAVELETS AND ITS APPLICATIONS  L  T  P  C

OBJECTIVES

- To study the basics of signal representation and Fourier theory
- To understand Multi Resolution analysis and Wavelet concepts
- To understand the wavelet transform in discrete domain
- To understand the design of wavelets using lifting scheme
- To understand the applications of wavelet transform

UNIT I  FUNDAMENTALS OF SIGNAL DECOMPOSITIONS  9

UNIT II  DISCRETE TIME BASIS AND FILTER BANKS  9

UNIT III  MULTI RESOLUTION CONCEPT AND MODULATED BASES  9

UNIT IV  WAVELET SYSTEM DESIGN  9
Daubechies method for zero wavelet moment design. Non-maximal regularity wavelet design. Relation of zero wavelet moments to smoothness, Approximation of scaling coefficients by sample of the signal and by scaling function projection. Tiling the time frequency and time scale plane.

UNIT V  APPLICATIONS  9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC018 EMBEDDED AND REAL TIME SYSTEMS  

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OBJECTIVES
- This course discusses organization, architecture, design and development of real time embedded systems.

UNIT I INTRODUCTION TO EMBEDDED COMPUTING  

UNIT II COMPUTING PLATFORM AND DESIGN ANALYSIS  
CPU buses – Memory devices – I/O devices – Component interfacing – Design with microprocessors – Development and Debugging – Program design – Model of programs Assembly and Linking – Basic compilation techniques – Analysis and optimization of execution time, power, energy, program size – Program validation and testing.

UNIT III PROCESS AND OPERATING SYSTEMS  

UNIT IV HARDWARE ACCELERATES AND NETWORKS  
Accelerators – Accelerated system design – Distributed Embedded Architecture – Networks for Embedded Systems – Network based design – Internet enabled systems.

UNIT V CASE STUDY  
Data Compressor - Software Modem – Personal Digital Assistants – Set–Top–Box. – System-on Silicon.

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
## BEC019 BIOSIGNAL PROCESSING

### OBJECTIVES
- To study about various filtering techniques.
- To perform frequency domain analysis of non stationary signal.

### UNIT I SIGNALS AND FILTERING TECHNIQUES

### UNIT II SIGNAL AVERAGING AND FILTERING FOR REMOVAL OF ARTIFACTS

### UNIT III FREQUENCY DOMAIN ANALYSIS OF NON-STATIONARY SIGNALS

### UNIT IV BIOSIGNAL CLASSIFICATION AND DIAGNOSTIC DECISION
Diagnostic of bundle-branch block - Illustration, Pattern classification, supervised classification, unsupervised pattern classification, probabilistic models and statistical decision. Training test steps, Neural Network and application

### UNIT V NON LINEAR FILTERING TECHNIQUES

**TOTAL: 45 PERIODS**

### TEXT BOOKS

### REFERENCE
BEC020  ADVANCED ELECTRONIC SYSTEM DESIGN  L  T  P  C
3  0  0  3

OBJECTIVES

• To study RF components such as resonator, filter, transmission lines, etc.
• To learn design of RF amplifiers using transistors.
• To study modern Power Supplies using SCR and SMPS technology
• To learn about signal shielding & grounding techniques and study of A/D and D/A Converters.

UNIT I  INTRODUCTION TO RF DESIGN  9

UNIT II  RF TRANSISTOR AMPLIFIER DESIGN  9
Impedance matching using discrete components. Microstrip line matching networks. Amplifier classes of operation and biasing networks – Amplifier power gain, Unilateral design($S_{12} =0$) – Simple input and output matching networks – Bilateral design - Stability circle and conditional stability, Simultaneous conjugate matching for unconditionally stable transistors. Broadband amplifiers, High power amplifiers and multistage amplifiers.

UNIT III  DESIGN OF POWER SUPPLIES  9
DC power supply design using transistors and SCRs, Design of crowbar and foldback protection circuits, Switched mode power supplies, Forward, flyback, buck and boost converters, Design of transformers and control circuits for SMPS

UNIT IV  DESIGN OF DATA ACQUISITION SYSTEMS  9
Amplification of Low level signals, Grounding, Shielding and Guarding techniques, Dual slope, quad slope and high speed A/D converters, Microprocessors Compatible A/D converters, Multiplying A/D converters and Logarithmic A/D converters, Sample and Hold, Design of two and four wire transmitters.

UNIT V  DESIGN OF PRINTED CIRCUIT BOARDS  9
Introduction to technology of printed circuit boards (PCB), General lay out and rules and parameters, PCB design rules for Digital, High Frequency, Analog, Power Electronics and Microwave circuits, Computer Aided design of PCBs.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC021  GLOBAL NAVIGATION SATELLITE SYSTEM  L  T  P  C
3  0  0  3

OBJECTIVES
To gain knowledge about
• Types of signals used in the GPS systems and accuracy limits.
• Latest versions of GPS and its application.

UNIT I  OVERVIEW OF GPS  9
Introduction to Global navigation satellite system, Kepler’s law and orbital dynamics, Satellite Orbital parameters, Orbital Perturbations, GPS observables, Basic Equations for finding user position, pseudorange measurement in receiver, user position determination from pseudoranges.

UNIT II  GPS SATELLITE CONSTELLATION AND SIGNAL STRUCTURE  9
GPS System segments - signals - signal generation – Signal characteristics – signal power levels, Determination of GPS satellite coordinates, GPS data formats: receiver independent exchange format (RINEX).

UNIT III  DIFFERENTIAL GPS  9
Basic concepts of DGPS, Local area DGPS, Extension of Range of Accurate DGPS, Real time and Post processing DGPS, Data link, RTCM format.

UNIT IV  GPS RECEIVERS AND ERRORS  9
GPS receiver, Signal conditioning, Signal Acquisition, Carrier and code tracking, Converting tracking outputs to Navigation data, Subframe matching and Parity check, GNSS antennas, Weak signals and their Acquisition, GPS Error sources, Error correction models, Receiver noise, Ionospheric effects on GPS signals.

UNIT V  GLOBAL NAVIGATION SATELLITE SYSTEM  9
GLONASS components – Constellation details – Signal structure – Time and Co-ordinate systems, NAVSTAR GPS, GALILEO.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEC022 MOBILE ADHOC NETWORKS L T P C
3 0 0 3

OBJECTIVES
- To give knowledge of mobile adhoc networks, design and implementation issues, and available solutions.
- To give information about Medium Access Protocol and Network Protocol.
- To design cross layer and integration for 4G networks.

UNIT I INTRODUCTION
Introduction to adhoc networks - definition, characteristics features, applications. Characteristics of Wireless channel, adhoc Mobility Models: - Indoor and out door models.

UNIT II MEDIUM ACCESS PROTOCOLS
MAC Protocols: design issues, goals and classification. Contention based protocols- with reservation, scheduling algorithms, protocols using directional antennas. IEEE standards: 802.11a, 802.11b, 802.11g, 802.15. HIPERLAN.

UNIT III NETWORK PROTOCOLS

UNIT IV END-END DELIVERY AND SECURITY

UNIT V CROSS LAYER DESIGN AND INTEGRATION OF ADHOC FOR 4G
Cross layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, Cross layer cautionary perspective, Sensor Network Architecture, Data Dissemination, Data Gathering, Location Discovery, Quality of a Sensor Network Integration of adhoc with Mobile IP networks.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVES

• To provide an understanding of the networking standards that can be adopted with the current day requirements of complex and voluminous content transfer over heterogeneous platforms.
• To have a primitive level performance analysis for of traffic with different networking standards and to study the standards adopted for handling high traffic.
• To get a feel of designing a High speed network setup with specialized hardware and optimization approaches like parallelism and pipelining.

UNIT I  HIGH SPEED NETWORKS  9

UNIT II  CONGESTION AND TRAFFIC MANAGEMENT  9

UNIT III  TCP AND ATM CONGESTION CONTROL  9

UNIT IV  INTEGRATED AND DIFFERENTIATED SERVICES  9

UNIT V  PROTOCOLS FOR QOS SUPPORT  9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BMG701 TOTAL QUALITY MANAGEMENT L T P C 3 0 0 3

OBJECTIVES

- To understand the Total Quality Management concept and principles and the various tools available to achieve Total Quality Management.
- To understand the statistical approach for quality control.
- To create an awareness about the ISO and QS certification process and its need for the industries.

UNIT I INTRODUCTION 9
Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of manufacturing and service quality - Basic concepts of TQM - Definition of TQM – Contributions of Deming, Juran and Crosby – Cost of Quality, Analysis Techniques for Quality Costs - Barriers to TQM.

UNIT II TQM PRINCIPLES 9

UNIT III TQM TOOLS & TECHNIQUES I 9

UNIT IV TQM TOOLS & TECHNIQUES II 9

UNIT V QUALITY SYSTEMS 9

TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES