REGULATIONS – 2011

DEPARTMENT OF

ELECTRONICS AND INSTRUMENTATION ENGINEERING

CURRICULUM AND SYLLABI OF

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

SEMESTER – I

Common to all B.E. / B.Tech. Degree Programmes

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# SEMESTER VI (ELECTIVE I & II)

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# SEMESTER VII (ELECTIVE III & IV)

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# SEMESTER VIII (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. Making sentences using modal verbs to express probability
2. Gap filling using relevant grammatical form of words.
3. Writing extended definitions
4. Speaking – role play activities, discussions, extempore speaking exercises speculating about the future.
5. Any other related relevant classroom activity

UNIT V

Suggested activities:
1. Sentence completion exercises using ‘If’ conditionals.
2. Gap filling exercises using gerunds and present participle forms
3. Reading comprehension exercises.
4. Role play, discussion, debating and speaking activities for stating, discussing problems and suggesting solutions.
5. Writing letters to officials and to the editor in formal/official contexts.
6. 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 L T P C 3 0 0 3

UNIT I ULRASONICS 9

UNIT II LASERS 9

UNIT III FIBER OPTICS & APPLICATIONS 9

UNIT IV QUANTUM PHYSICS 9

UNIT V CRYSTAL PHYSICS 9
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.

TOTAL: 45 PERIODS

TEXT BOOKS
REFERENCES

BCY101  ENGINEERING CHEMISTRY – I  L T P C  3 0 0 3

UNIT I  WATER TECHNOLOGY  9

UNIT II  POLYMERS AND COMPOSITES  9

UNIT III  SURFACE CHEMISTRY  9

UNIT IV  NON-CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES  9

UNIT V  ENGINEERING MATERIALS  9

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  12
CURVES USED IN ENGINEERING PRACTICES:
Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of
cyloid – 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  12
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  12
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  12
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  12
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
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.
3. Determination of acceptance angle in an optical fiber.
5. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
8. Determination of Hysteresis loss in a ferromagnetic material.

B. CHEMISTRY LABORATORY – I

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  L T P C
0 0 3 2

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  
(Common to all branches)

L  T  P  C
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
   Exercises – Using sequence words
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. Brainstorming and discussion
3. Writing Critical essays
4. Writing short proposals of 2 pages for starting a project, solving problems, etc.
5. Writing advertisements

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

TOTAL 45 periods
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
(Common to all branches)

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 parallepipeds.

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
Complex integration – Statement and applications of Cauchy’s integral theorem and Cauchy’s
integral formula – Taylor and Laurent expansions – Singular points – Residues – Residue theorem –
Application of residue theorem to evaluate real integrals – Unit circle and semi-circular
contour(excluding poles on boundaries).

UNIT V LAPLACE TRANSFORM 12
Laplace transform – Conditions for existence – Transform of elementary functions – Basic properties
– Transform of derivatives and integrals – Transform of unit step function and impulse functions
– Transform of periodic functions. Definition of Inverse Laplace transform as contour integral –
Convolution theorem (excluding proof) – Initial and Final value theorems – Solution of linear
ODE of second order with constant coefficients using Laplace transformation techniques.

TOTAL: 60 PERIODS

TEXT BOOK
(2007).

REFERENCES
New Delhi (2007).
BPH201 ENGINEERING PHYSICS – II (Common to all branches) L T P C 3 0 0 3

UNIT I CONDUCTING MATERIALS 9

UNIT II SEMICONDUCTING MATERIALS 9

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS 9

UNIT IV DIELECTRIC MATERIALS 9

UNIT V MODERN ENGINEERING MATERIALS 9

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)  
3 1 0 4

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) 3 1 0 4

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)
L T P C
3 1 0 4

UNIT I CIRCUIT ANALYSIS TECHNIQUES

UNIT II TRANSIENT & RESONANCE IN RLC CIRCUITS

UNIT III SEMICONDUCTOR DIODES

UNIT IV TRANSISTORS
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)
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
(a) **BEE202 BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

(For Mechanical & Civil Branches)

**L T P C**

4 0 0 4

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**UNIT I ELECTRICAL CIRCUITS & MEASUREMENTS**


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**UNIT II ELECTRICAL MACHINES**


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**UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS**


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**UNIT IV DIGITAL ELECTRONICS**


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**UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING**


**TOTAL: 60 PERIODS**

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**TEXT BOOKS**


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**REFERENCES**

(b) BME202 BASIC CIVIL & MECHANICAL ENGINEERING
(For CSE, ECE, EEE, EIE & IT branches)
L T P C
4 0 0 4

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
BPC231  PHYSICS AND CHEMISTRY LABORATORY – II  L  T  P  C
(Common to all branches)     0  0  3  2

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  
(For Mechanical & Civil Branches)  
L T P C  
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 B spline 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)

LIST OF EXPERIMENTS

- Verification of ohm’s laws and kirchhoff’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)

- 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  0  0  3  2

(Common to all branches)

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

AIM
The aim of this course is to create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional endeavour that they participates.

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 –biogeographically 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  SOCIAL ISSUES AND THE ENVIRONMENT  7

UNIT V  HUMAN POPULATION AND THE ENVIRONMENT  6

TOTAL:  45

TEXT BOOKS

REFERENCES
BEE305 ELECTRICAL MACHINES L T P C
3 0 0 3

AIM
To impart basic knowledge on Electrical machines, principles and its behavior.

OBJECTIVES
At the end of this course, student would have been exposed to:
• Theory of structures, operating principle, characteristics, and applications of D.C and A.C rotating machines and transformers in detail.
• Introductory knowledge on Special Machines.

UNIT I D.C. MACHINES 12

UNIT II TRANSFORMERS 9

UNIT III SYNCHRONOUS MACHINES 8
Principle of alternators:- Construction details, Equation of induced EMF and Vector diagram - Synchronous motor:- Starting methods, Torque, V curves, Speed control and Hunting.

UNIT IV INDUCTION MACHINES 9
Induction motor:- Construction and principle of operation, Classification of induction motor, Torque equation, Condition for maximum torque, Equivalent Circuit, Starting methods and Speed control of induction motors.

UNIT V SPECIAL MACHINES 7

L = 45 TOTAL = 45

TEXT BOOKS

REFERENCES
BEI301   ELECTRICAL MEASUREMENTS          L   T   P   C
                          4   0   0   4

AIM
To provide adequate knowledge in electrical measurements and instrumentation

OBJECTIVES
• To make the students to gain a clear knowledge of the basic laws governing the operation of electrical instruments and the measurement techniques
• Emphasis is laid on the meters used to measure current & voltage.
• To have an adequate knowledge in the measurement techniques for power and energy, power and energy meters are included.
• Elaborate discussion about potentiometer & instrument transformers.
• Detailed study of resistance measuring methods.
• Detailed study of inductance and capacitance measurement.

UNIT I  MEASUREMENT OF VOLTAGE AND CURRENT          9

UNIT II  MEASUREMENT OF POWER AND ENERGY          9

UNIT III  POTENTIOMETERS & INSTRUMENT TRANSFORMERS      9
DC potentiometer – Basic circuit, standardization – Laboratory type (Crompton’s) – AC potentiometer – Drysdale (polar type) type – Gall-Tinsley (coordinate) type – Limitations & applications – C.T and P.T construction, theory, operation and characteristics.

UNIT IV  RESISTANCE MEASUREMENT          9

UNIT V  IMPEDANCE MEASUREMENT          9

L = 45 T = 15 Total = 60

TEXT BOOKS
REFERENCES
BEI302 ELECTRONIC DEVICES AND CIRCUITS

L T P C 3 0 0 3

AIM
To provide an exposure to various electronic devices and electronic circuits.

OBJECTIVE
• At the end of the course, students’ will have the knowledge about functioning of various types of devices and design of various electronic circuits.

UNIT I SEMICONDUCTOR DIODE AND BJT

UNIT II FET, UJT and SCR
JFET characteristics and parameters – JFET biasing, self bias, voltage divider bias – Q point, stability over temperature – MOSFET, D-MOSFET, E-MOSFET – MOSFET characteristics and parameters – MOSFET biasing, zero bias, voltage divider bias method, drain feedback bias – Characteristics and applications of UJT, SCR, DIAC, TRIAC.

UNIT III AMPLIFIERS

UNIT IV FEEDBACK AMPLIFIERS AND OSCILLATORS
Advantages of Negative feedback - Voltage/current, series/shunt feedback-Positive feedback - Condition for oscillators - Phase shift - Wein Bridge – Hartley - Colpitts and crystal oscillators.

UNIT V PULSE CIRCUITS AND POWER SUPPLIES

L = 45 TOTAL = 45

TEXT BOOKS

REFERENCES
BCS304   DATA STRUCTURES AND ALGORITHMS             L T P C
(Common to EEE & EIE)                      3 0 0 3

AIM
• To master the design and applications of linear, tree, and graph structures. To understand various algorithm design and analysis techniques.

UNIT I   LINEAR STRUCTURES                                9
Abstract Data Types (ADT) – List ADT – array-based implementation – linked list implementation – cursor-based linked lists – doubly-linked lists – applications of lists – Stack ADT – Queue ADT – circular queue implementation – Applications of stacks and queues

UNIT II   TREE STRUCTURES                                 9
Need for non-linear structures – Tree ADT – tree traversals – left child right sibling data structures for general trees – Binary Tree ADT – expression trees – applications of trees – binary search tree ADT

UNIT III   BALANCED SEARCH TREES AND INDEXING              9
AVL trees – Binary Heaps – B-Tree – Hashing – Separate chaining – open addressing – Linear probing

UNIT IV   GRAPHS                                         9

UNIT V   ALGORITHM DESIGN AND ANALYSIS                    9

L = 45 Total = 45

TEXT BOOKS

REFERENCES
1. Characteristics of Semiconductor diode and Zener diode
2. Characteristics of Transistor in Common Emitter, Common Collector, and Common Base Configuration
3. Characteristics of FET
4. Characteristics of UJT
5. Characteristics of SCR, DIAC and TRIAC
6. Photo diode, phototransistor Characteristics and study of light activated relay circuit
7. Static Characteristics of Thermistors
8. Single phase half wave and full wave rectifiers with inductive and capacitive filters
9. Differential amplifier using FET
10. Study of CRO
11. Series and Parallel resonance circuits
12. Realization of Passive filters

\[ P = 45 \quad \text{TOTAL} = 45 \]
BEE334  ELECTRICAL MACHINES LABORATORY  L  T  P  C
0  0  3  2

1. Open circuit characteristic of DC Shunt Generator
2. Load test on DC Shunt Generator
3. Speed control of DC Shunt Motor
4. Brake test on DC Shunt Motor
5. Brake test on DC Series Motor
6. Regulation characteristic of three-phase Alternator
7. Open circuit and short circuit tests on Single-phase Transformer
8. Load test on Single-phase Transformer
9. Load test on Three-phase Induction Motor
10. Brake test on Single-phase Induction Motor
11. ‘V’ curves of Synchronous Motor
12. Power measurement in three-phase circuit using two-wattmeter method

P = 45 TOTAL = 45
Aim

To develop skills in design and implementation of data structures and their applications.

1. Implement singly and doubly linked lists.
2. Represent a polynomial as a linked list and write functions for polynomial addition.
3. Implement stack and use it to convert infix to postfix expression
4. Implement array-based circular queue and use it to simulate a producer consumer problem.
5. Implement an expression tree. Produce its pre-order, in-order, and post-order traversals.
6. Implement binary search tree.
7. Implement insertion in AVL trees.
8. Implement priority queue using heaps
9. Implement hashing techniques
10. Perform topological sort on a directed graph to decide if it is acyclic.
11. Implement Dijkstra's algorithm using priority queues
12. Implement Prim's and Kruskal's algorithms
13. Implement a backtracking algorithm for Knapsack problem
14. Implement a branch and bound algorithm for traveling salesperson problem
15. Implement any randomized algorithm.

P = 45 Total = 45
BEG331 COMMUNICATION SKILLS AND TECHNICAL SEMINAR – I  
(Common to all branches)  
L T P C  
0 0 3 2  
(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)
1. English phonemes with special emphasis on the diphthongs
2. Stress patterns for words that end with specific suffixes.  

B) Speech practice (8 hrs)
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)
1. comparing and contrast
2. reporting the conversation of others
3. talking about future plans and intentions
4. giving reasons
5. expressing preferences
6. quantifying
7. expressing certainty and uncertainty
8. expressing opinions and impressions
9. making suggestions
10. expressing assumptions
11. evaluating options
12. hypothesing/deducing
13. 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.

- First page containing learner details and the topic of specialization.
- Twenty words for each phoneme
- Twenty words with stress marks for each suffix ending
- Vocabulary list (technical words and compound words) related to the 20 themes identified for this semester.
- 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)
- The Quiz questions of the group with expected answers.
- The seminar paper presented by the learner with details about the open house.
- Notes of observation. (Details about any three seminar paper presentations by others)
- 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
BEI401 INDUSTRIAL INSTRUMENTATION - I  

AIM
To equip the students with relevant knowledge to suit the industrial requirements

OBJECTIVES
- To provide sound knowledge about various techniques used for the measurement of industrial parameters.
- Discussion of load cells, torque meter and various velocity pick-ups.
- Exposure to various accelerometer pick-ups, vibrometers, density and viscosity pick-ups.
- To have an adequate knowledge about pressure transducers.
- To have an idea about the temperature standards, calibration and signal conditioning used in RTD’s.
- To have a sound knowledge about thermocouples and pyrometry techniques.

UNIT I MEASUREMENT OF FORCE, TORQUE AND VELOCITY  

UNIT II MEASUREMENT OF ACCELERATION, VIBRATION AND DENSITY  
Accelerometers:- LVDT, Piezo-electric, Strain gauge and Variable reluctance type accelerometer – Mechanical type vibration instruments – Seismic instruments as an accelerometer – Vibrometers : Calibration of vibration pickups – Units of density and specific gravity – Baume scale, and API scale-Pressure head type densitometers- Float type densitometers – Ultrasonic densitometer- Bridge type gas densitometer.

UNIT III PRESSURE MEASUREMENT  
Units of pressure-Manometers-Different types –Elastic type pressure gauges: Bourdon tube, bellows and diaphragms-Electrical methods: Elastic elements with LVDT and strain gauges –Capacitive type pressure gauge –Piezo-resistive pressure sensor-Resonator pressure sensor-Measurement of vacuum:- McLeod gauge-Thermal conductivity gauges- Ionization gauges:- Cold cathode type and hot cathode type-Testing and calibration of pressure gauges-Dead weight tester.

UNIT IV TEMPERATURE MEASUREMENT  
Definitions and standards-Primary and secondary fixed points –Calibration of thermometers - Different types of filled in system thermometer-Sources of errors in filled in systems and their compensation-Bimetallic thermometers – Electrical methods of temperature measurement-Signal conditioning of industrial RTDs and their characteristics-3 lead and 4 lead RTDs - Thermistors.

UNIT V THERMOCOUPLES AND RADIATION PYROMETERS  

56
TEXT BOOKS

REFERENCES
BEI402 TRANSUDER ENGINEERING

AIM
To provide adequate knowledge in sensors and transducers

OBJECTIVES
• To impart knowledge about the principles and analysis of sensors.
• Discussion of errors and error analysis.
• Emphasis on characteristics and response of transducers.
• To have an adequate knowledge in resistance transducers.
• Basic knowledge in inductance and capacitance transducers and exposure to other transducers.

UNIT I SCIENCE OF MEASUREMENTS AND INSTRUMENTATION OF TRANSDUCERS 9

UNIT II CHARACTERISTICS OF TRANSDUCERS 9

UNIT III VARIABLE RESISTANCE TRANSDUCERS 9
Principle of operation, construction details, characteristics and application of potentiometer, strain gauge, resistance thermometer, Thermistor, hot-wire anemometer, piezoresistive sensor and humidity sensor.

UNIT IV VARIABLE INDUCTANCE AND VARIABLE CAPACITANCE TRANSDUCERS 9

UNIT V OTHER TRANSDUCERS 9
Piezoelectric transducer, Hall Effect transducer – Different types of Photo detectors- Digital transducers – Smart sensors - Fibre optic sensors, SQUID sensors, Film sensors, MEMS – Nano sensors.

L = 45 Total = 45

TEXT BOOKS

REFERENCES
BEI403 DIGITAL CIRCUITS

AIM

To introduce the fundamentals of digital circuits, combinational and sequential circuit

OBJECTIVES

• To study various number systems and to simplify the mathematical expressions using Boolean functions – simple problems.
• To study implementation of combinational circuits
• To study the design of various synchronous and asynchronous circuits.
• To expose the students to various memory devices.

UNIT I NUMBER SYSTEMS AND BOOLEAN ALGEBRA 12

UNIT II COMBINATIONAL CIRCUITS 12

UNIT III SYNCHRONOUS SEQUENTIAL CIRCUITS 12
Flip flops - SR, D, JK and T. Analysis of synchronous sequential circuits: design of synchronous, sequential circuits – Completely and incompletely specified sequential circuits - state diagram; state reduction, state assignment Counters – synchronous, a synchronous, updown and Johnson counters, shift registers.

UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS 12
Analysis of asynchronous sequential machines, state assignment, asynchronous design problem.

UNIT V MEMORY DEVICES, PROGRAMMABLE LOGIC DEVICES AND LOGIC FAMILIES 12
Memories: ROM, PROM, EPROM, PLA, PLD, FPGA, Digital logic families: TTL, ECL, CMOS.

L = 45 T = 15 Total = 60

TEXT BOOKS

REFERENCES
BEE402 CONTROL SYSTEMS (Common to EEE & EIE) L T P C 3 1 0 4

AIM
To provide sound knowledge in the basic concepts of linear control theory and design of control system.

OBJECTIVES
• To understand the methods of representation of systems and to derive their transfer function models.
• To provide adequate knowledge in the time response of systems and steady state error analysis.
• To accord basic knowledge in obtaining the open loop and closed-loop frequency responses of the system.
• To understand the concept of stability of control system and methods of stability analysis.
• To study the three ways of designing compensation for a control system.

UNIT I SYSTEMS AND THEIR REPRESENTATION 9

UNIT II TIME RESPONSE 9

UNIT III FREQUENCY RESPONSE 9
Frequency response – Bode plot – Polar plot – Determination of closed loop response from open loop response – Correlation between frequency domain and time domain specifications.

UNIT IV STABILITY OF CONTROL SYSTEM 9

UNIT V COMPENSATOR DESIGN 9
Performance criteria – Lag, lead and lag-lead networks – Compensator design using bode plots.

L = 45 T = 15 Total = 60

TEXT BOOKS

REFERENCES
3. Samarajit Ghosh, Control systems, Pearson Education, New Delhi, 2004
BE1404 LINEAR INTEGRATED CIRCUITS AND APPLICATIONS L T P C
(Common to EEE & EIE) 3 0 0 3

AIM
To introduce the concepts for realizing functional building blocks in ICs, fabrications & application of ICs.

OBJECTIVES
• To study the IC fabrication procedure.
• To study characteristics, realize circuits, design for signal analysis using Op-amp ICs.
• To study the applications of Op-amp.
• To study internal functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits, ADCs.

UNIT I IC FABRICATION
IC classification, fundamental of monolithic IC technology, epitaxial growth, masking and etching, diffusion of impurities. Realisation of monolithic ICs and packaging. Fabrication of diodes, capacitance, resistance and FETs.

UNIT II CHARACTERISTICS OF OPAMP
Ideal OP-AMP characteristics, DC characteristics, AC characteristics, offset voltage and current: voltage series feedback and shunt feedback amplifiers, differential amplifier; frequency response of OP-AMP; Basic applications of op-amp – summer, differentiator and integrator.

UNIT III APPLICATIONS OF OPAMP
Instrumentation amplifier, first and second order active filters, V/I & I/V converters, comparators, multivibrators, waveform generators, clippers, clamping, peak detector, S/H circuit, D/A converter (R-2R ladder and weighted resistor types), A/D converter - Dual slope, successive approximation and flash types.

UNIT IV SPECIAL ICs
555 Timer circuit – Functional block, characteristics & applications; 566-voltage controlled oscillator circuit; 565-phase lock loop circuit functioning and applications, Analog multiplier ICs

UNIT V APPLICATION ICs
IC voltage regulators - LM317, 723 regulators, switching regulator, MA 7840, LM 380 power amplifier, ICL 8038 function generator IC, isolation amplifiers, opto coupler, opto electronic ICs.

L = 45 Total = 45

TEXT BOOKS

REFERENCES
BME404  APPLIED THERMODYNAMICS  L T P C
                                          3 1 0 4

OBJECTIVES

• To expose the fundamentals of thermodynamics and to be able to use it in accounting for the
  bulk behaviour of the sample physical systems.
• To integrate the basic concepts into various thermal applications like IC engines, gas turbines,
  steam boiler, steam turbine, compressors, refrigeration and air conditioning.
• To enlighten the various modes of heat transfer and their engineering applications.

Use of standard steam tables, refrigeration tables and heat transfer data book are permitted)

UNIT I  BASIC CONCEPTS AND LAWS OF THERMODYNAMICS  12
Classical approach: Thermodynamic systems – Control volume - System and surroundings – Universe
– Properties - State-process – Cycle – Equilibrium - Work and heat transfer – Point and path functions
- First law of thermodynamics for open and closed systems - First law applied to a control volume -
SFEE equations [steady flow energy equation] - Second law of thermodynamics - Heat engines -
Refrigerators and heat pumps - Carnot cycle - Carnot theorem.

UNIT II  IC ENGINES  8
Air standard cycles: Otto, diesel and dual cycles and comparison of efficiency – Working Principle of
four stroke and two stroke engines - Working principle of spark ignition and compression ignition
engines - Application of IC engines.

UNIT III  STEAM BOILERS AND TURBINES  8
Formation of steam - Properties of steam – Use of steam tables and charts – Steam power cycle
(Rankine) - Modern features of high-pressure boilers – Mountings and accessories – Testing of
boilers. Steam turbines: Impulse and reaction principle – Velocity diagrams – Compounding and
governing methods of steam turbines (qualitative treatment only) - Layout and working principle of a
steam power plant.

UNIT IV  COMPRESSORS, REFRIGERATION AND AIR CONDITIONING  8
Positive displacement compressors – Reciprocating compressors – Indicated power – Clearance
volume – Various efficiencies – Clearance ratio - Volume rate - Conditions for perfect and imperfect
intercooling - Multi stage with intercooling – Rotary positive displacement compressors –
Construction and working principle of centrifugal and axial flow compressors. Refrigeration - Various
methods of producing refrigerating effects (RE) – Vapour compression cycle: P-H and T-S diagram -
Saturation cycles - Effect of subcooling and super heating - (qualitative treatment only) -
Airconditioning systems – Basic psychrometry - Simple psychrometric processes - Types of
airconditioning systems - Selection criteria for a particular application (qualitative treatment only).

UNIT V  HEAT TRANSFER  9
One-dimensional Heat Conduction: Plane wall – Cylinder – Sphere - Composite walls – Critical
thickness of insulation –Heat transfer through extended surfaces (simple fins).Convection: Free
convection and forced convection - Internal and external flow –Simple Empirical relations. Radiation:
Black–Gray bodies - Radiation Shape Factor (RSF) -Cooling of electronic components -
Thermoelectric cooling – Chip cooling.

L = 45 T = 15 Total = 60
TEXT BOOKS

REFERENCES
OBJECTIVES

The aim of this lab is to train the students in handling the different kinds of transducers like LVDT, Hall effect, Thermocouple etc., which he often meets in his study and also to impart the students an adequate knowledge and work experience of the different types of AC and DC bridges, electronic measurement methods for different electronic instruments.

1. Displacement versus output voltage characteristics of a potentiometric transducer.
2. Characteristics of Strain gauge and Load cell.
3. Characteristics of LVDT, Hall effect transducer and Photoelectric tachometer.
4. Characteristic of LDR, thermistor and thermocouple.
5. Step response characteristic of RTD and thermocouple and Study of smart transducers.
6. Wheatstone and Kelvin’s bridge for measurement of resistance.
7. Schering Bridge for capacitance measurement and Anderson Bridge for inductance measurement.
9. Calibration of Ammeter and Voltmeter using Student type potentiometer.

P = 45 TOTAL = 45
BEI432 LINEAR AND DIGITAL INTEGRATED CIRCUITS LABORATORY  L T P C
0 0 3 2

AIM
To study various digital & linear integrated circuits used in simple system configuration.

1. Study of Basic Digital IC’s. (Verification of truth table for AND, OR, EXOR, NOT, NOR, NAND, JK FF, RS FF, D FF)
2. Implementation of Boolean Functions, Adder/ Subtractor circuits.
3. Code converters, Parity generator and parity checking, Excess-3, 2s Complement, Binary to Gray code, Encoders and Decoders using suitable IC’s.
4. Counters: Design and implementation of 4-bit modulo counters as synchronous and Asynchronous types using FF IC’s and specific counter IC.
5. Shift Registers: Design and implementation of 4-bit shift registers in SISO, SIPO, PISO, PIPO modes using suitable IC’s.
7. Timer IC application: Study of NE/SE 555 timer in Astable, Monostable operation.
9. Study of Analog to Digital Converter and Digital to Analog Converter: Verification of A/D conversion using dedicated IC’s.
10. Study of VCO and PLL ICs:
   i. Voltage to frequency characteristics of NE/ SE 566 IC.
   ii. Frequency multiplication using NE/SE 565 PLL IC.

P = 45 Total = 45
1. Valve timing and port timing diagrams for IC Engines.
2. Performance test on a Petrol Engine.
3. Performance test on a Diesel Engine.
6. Performance test on a Refrigerator (Determination of COP)
7. Determination of heat transfer Coefficient (Free and forced convection)
8. Test to estimate frictional losses in pipe flow.
9. Test on reaction turbine for obtaining the characteristics curves and to design values of specific speed, discharge, output and efficiency.
10. Test on impulse turbine to obtain its characteristics curves and hydraulic design values.
BEG431 COMMUNICATION SKILLS AND TECHNICAL SEMINAR – II  
(Common to all branches) 
L T P C  
0 0 3 2  

(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. /ae/ 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 practising 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.

- First page containing learner details and the topic of specialization.
- Twenty words for each phoneme /æ/, /ei/, /i/ and /e/.
- 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)
- Vocabulary list (technical words and compound words) related to the 10 themes identified for this semester.
- 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)
- The seminar paper presented by the learner with a soft copy of the power point frames.
- Notes of observation. (Details about any two seminar paper presentations by others)
- 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
BEI501 INDUSTRIAL INSTRUMENTATION – II  

L T P C  
3 0 0 3  

OBJECTIVE:
- To expose students to mechanical flow meters, mass flow meters and electrical type flow meters and different techniques for solid and liquid level measurements, viscosity and humidity measurements.

UNIT I VARIABLE HEAD TYPE FLOWMETERS  
Theory of fixed restriction variable head type flow meters: - principle of operation of orifice flow meter - Types, Machining methods and position of taps in orifice plates - Principle of operation of venturi flow meters, Types of venturi tubes – Installation of head flow meters – Principle, construction and application of Flow nozzle, Dall tube and Pitot tube.

UNIT II QUANTITY METERS, AREA FLOW METERS AND MASS FLOW METERS  

UNIT III ELECTRICAL TYPE FLOW METER  

UNIT IV LEVEL MEASUREMENT  
Level measurement: - Float, Displacer type and Bubbler system – Electrical level gauge: - Resistance and Capacitance – Nuclear radiation and Ultrasonic types – Radar Level Transmitters – Vibration and microwave level switches - Boiler drum level measurement:- Differential Pressure Method and Hydrostatic types – Solid level measurement.

Leading manufacturers of flow and level instruments with specifications. (Non-descriptive)

UNIT V MEASUREMENT OF VISCOSITY, HUMIDITY AND MOISTURE  
Viscosity: - Say bolt viscometer and Rotameter type viscometer – Consistency meters – Dry and wet bulb psychrometers – Hot wire electrode type hygrometer, Dew cell and Electrolysis type hygrometer – Commercial type dew point meter – Moisture measurement: - Infrared absorption hygrometer, microwave absorption hygrometer-Nuclear moisture gauge - Application of moisture measurement.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEI502                  DIGITAL SYSTEM DESIGN                  L T P C
                                           3 1 0 4

OBJECTIVES:

- To build the basics of digital systems design with a focus on FPGA design.
- To understand the combinational and sequential hardware system design.

UNIT I      DIGITAL LOGIC FAMILIES                      12
TTL, CMOS, NMOS, Dynamic MOS, ECL, I2L, Operating conditions, Parameters, Interpreting data
sheets. Power supply grounding considerations for digital ICs, TTL – to – CMOS Interface, CMOS –
to – TTL interface.

UNIT II     DIGITAL MEMORIES                         12
The role of Memory in a system – memory types and terminology – ROM – types of ROM – RAM –
SRAM – DRAM – Expanding word size and capacity – Applications.

UNIT III   SYSTEM DESIGN USING PLDs AND CPLDs          12
Structure of Standard PLDs and Complex PLDs (CPLDs) – Design of combinational and sequential
circuits using PLDs and CPLDs – Design of state machines using Algorithmic State Machines (ASM)
chart as a design tool.

UNIT IV     INTRODUCTION TO FIELD PROGRAMMABLE GATE ARRAYS (FPGAs) 12
Types of FPGA – Xilinx XC3000 series – Logic Cell Array (LCA) – Configurable Logic Blocks
(CLB) – Input/Output Blocks (IOB) – Programmable Interconnection Points (PIP) – Introduction to
ACT 2 family and Xilinx SPARTAN, VIRTEX, FPGA – Design examples.

UNIT V      TESTING IN DIGITAL CIRCUITS AND DESIGN FOR TESTABILITY    12
Detection and location of faults in combinational logic circuits – Stuck-at-fault model – Path
sensitising method – Boolean difference method – Fault detection and location in synchronous
sequential circuits – Design for testability – Adhoc techniques – Scan registers – Level Sensitive Scan
Design – Boundary Scan -Built-in-self test.

L: 45    T: 15  TOTAL: 60 PERIODS

TEXT BOOKS
2. Donald. P. Leach, Albert paul Malvino, Goutam Suha,“Digital Principles and Applications”,
3. Miron Abramonic, Melvin. A. Rrewer, Arthur.D. Friedman, “Digital system testing and
testable design”, Jaico publishing house, 2002.

REFERENCE BOOK
BE1503 MICROPROCESSOR AND MICROCONTROLLER PROGRAMMING  \( L \ T \ P \ C \)
3 1 0 4

OBJECTIVES:
- To lay an in-depth foundation of 8 bit microprocessor using 8085 family and to develop skill in simple program writing for applications.
- To introduce commonly used peripheral / interfacing ICs
- To study the Architecture of Intel 8051 family of 8 bit microcontroller and peripheral programming using SFR

UNIT I  8085 MICROPROCESSOR AND ADVANCED MICROPROCESSORS  12

UNIT II  PERIPHERAL INTERFACE PROGRAMMING  12
Programmable Peripheral Interface (8255) - USART (8251) – Programmable interval timer (8253) - Programmable DMA Controller (8257) - Programmable Interrupt controller (8259) - Keyboard display controller (8279)

UNIT III  ARCHITECTURE AND PROGRAMMING OF 8051 MICROCONTROLLER  12
Architecture - Memory Organization - Special function Registers (SFR) - I/O pins, ports and circuits - Addressing modes -Instruction set - Boolean processing- Assembly language programming.

UNIT IV  8051 PERIPHERALS PROGRAMMING  12
Timer and Counter Programming - Serial Communication programming - Interrupts programming - External Memory Interface – Interfacing of keyboard and liquid crystal display.

UNIT V  MICROPROCESSOR BASED SYSTEMS DESIGN  12

L: 45  T: 15  TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
BEI504 COMMUNICATION SYSTEMS L T P C 3 0 0 3

OBJECTIVES:
- To understand basic signals, analog modulation, demodulation and radio receivers.
- To introduce Digital Communication methods for high bit rate transmission
- To introduce the concepts of source and line coding techniques for enhancing rating of transmission of minimizing the errors in transmission.
- To learn the basics of satellite communication systems.
- To introduce the concepts of biomedical telemetry system.

UNIT I ANALOG MODULATION SYSTEMS 9
Amplitude modulation and demodulation- generation of AM - AM Transmitter & Receiver - Frequency spectrum, frequency modulation and demodulation- frequency spectrum- super heterodyne radio receiver. Frequency division multiplexing. Time Division multiplexing.

UNIT II DIGITAL COMMUNICATION 9
Pulse code modulation, digital T-carrier system. Digital radio system. Digital modulation: Amplitude Shift Key, Frequency and phase shift keying, Quadrature Phase Shift Key – Modulator and demodulator.

UNIT III SOURCE CODES, LINE CODES & ERROR CONTROL (Qualitative only) 9

UNIT IV SATELLITE COMMUNICATION SYSTEM 9
Introduction to satellite communication, Satellite Sub system, Earth station, Classification of multiple access techniques – FDMA, TDMA, CDMA, SDMA- Satellite applications- GPS

UNIT V BIOMEDICAL TELEMETRY SYSTEM 9
Components of telemetry system, Bio-telemetry and its importance, Single and multi-channel biotelemetry, ECG telemetry system, Temperature telemetry system, Telemetry of Respiration, Multi-patient telemetry, Implantable telemetry for blood pressure and blood flow systems, transmission of analog physiological signals over telephone line, Essential parameter for telemedicine and applications.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCS302 OBJECT ORIENTED PROGRAMMING L T P C (Common to 3rd Sem – CSE & IT, 5th Sem – EIE, 6th Sem – EEE) 3 0 0 3

OBJECTIVES

- To explore the OOP concepts
- To illustrate the techniques which form the OOP paradigm
- To develop ability to apply OOP concepts using C++
- To work with real-time applications using advanced features of C++ such as Exception handling, Templates and File Streams.

UNIT I BASICS OF OBJECT – ORIENTED PROGRAMMING 9

UNIT II CONSTRUCTORS AND FUNCTION OVERLOADING 9

UNIT III TEMPLATES AND EXCEPTION HANDLING 9

UNIT IV INHERITANCE 9

UNIT V I/O STREAMS 9

L =45 Total = 45 Periods

TEXT BOOK

REFERENCES
BGE501 PROFESSIONAL ETHICS AND HUMAN VALUES
(Concurrent 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 of 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
BEI531  MICROPROCESSOR AND MICROCONTROLLER  L  T  P  C
PROGRAMMING LABORATORY  0  0  3  2

OBJECTIVES:
• To introduce the hardware & software design basics of microprocessor and microcontroller.
• To understand the concepts of low level programming and its applications in engineering.

LIST OF EXPERIMENTS:
1. Study of 8085 Microprocessor kit
2. 8085 Assembly Language Programming Exercises.
   • Multi byte Binary Addition and Subtraction in 8085
   • Multi byte BCD Addition and subtraction in 8085
   • Table Processing using 8085
   • Multiplication and Division in 8085
3. Interfacing with 8085
   • Waveform Generation using 8255 and Display unit
   • Interfacing 8255 and 8253 with 8085.
   • Interfacing 8279 and 8251 with 8085.
   • Interfacing 8259 with 8085.
   • Interfacing Stepper motor with 8085.
4. 8051 Assembly Language Programming Exercises.
   • Addition and subtraction in 8051
   • Multiplication and Division in 8051
   • Programming 8051 on chip peripherals
   • Interfacing Stepper motor with 8051
5. Interfacing ADC with Microprocessor and Microcontroller.
6. Interfacing DAC with Microprocessor and Microcontroller.
7. Microprocessor based Data Logger.
9. Microprocessor based PID controller.
10. LCD Display Interface with 8051.

P: 45  TOTAL: 45 PERIODS
BCS332  OBJECT ORIENTED PROGRAMMING LABORATORY  L T P C
(Common to 3rd Sem – CSE & IT, 5th Sem – EIE, 6th Sem – EEE)  0 0 3 2

OBJECTIVES

- To provide fundamental knowledge and skills to practice C++ programming.
- To develop ability to solve real-time problems using OOPs concepts.
- To have an understanding and hands-on practice in advanced concepts of C++

LIST OF EXPERIMENTS

a. Design C++ classes with static members, methods with default arguments, friend functions. (For example, design matrix and vector classes with static allocation, and a friend function to do matrix-vector multiplication)
b. Implement complex number class with necessary operator overloading and type conversions such as integer to complex, double to complex, complex to double etc.
c. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
d. Overload the new and delete operators to provide custom dynamic allocation of memory.
e. Develop a template of linked-list class and its methods.
f. Develop templates of standard sorting algorithms such as bubble sort, insertion sort, merge sort, and quick sort.
g. Design stack and queue classes with necessary exception handling.
h. Define Point class and an Arc class. Define a Graph class which represents graph as a collection of Point objects and Arc objects. Write a method to find a minimum cost spanning tree in a graph.
i. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
j. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, *, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read, and write the result to another file (one per line).

Total = 45 Periods
BEI601  ANALYTICAL INSTRUMENTATION  L  T  P  C
3   0   0   3

OBJECTIVES:
• To study the various techniques of spectral analysis in the various regions of the EM spectrum.
• To learn unique methods of separation of closely similar materials i.e. chromatographic techniques and to gain the knowledge of electromagnetic resonance methods of analysis.
• To study important methods of analysis of industrial gases and environmental air pollution monitoring.
• To bring out the latest ideas on ion-selective electrodes which are used in chemical analysis.
• To gain the knowledge of microscopic methods of analysis in a complex mixture.

UNIT I  COLORIMETRY AND SPECTROPHOTOMETRY  9

UNIT II  CHROMATOGRAPHY AND ELECTROMAGNETIC RESONANCE TECHNIQUES  9

UNIT III  INDUSTRIAL GAS ANALYZERS AND POLLUTION MONITORING INSTRUMENTS  9

UNIT IV  pH METERS AND RADIATION DETECTORS  9

UNIT V  MICROSCOPIC TECHNIQUES  9

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCE BOOK
BE1602 MODERN ELECTRONIC INSTRUMENTATION  L T P C  3 0 0 3

OBJECTIVES:
- To make the students to gain a clear knowledge of the basics of digital instruments and measurement techniques.
- To have an adequate knowledge in various display and recording devices.
- To have an elaborate study of communication standards
- To have a study of virtual instrumentation and its applications.

UNIT I DIGITAL INSTRUMENTS  9

UNIT II DISPLAY AND RECORDING DEVICES  9
Cathode ray oscilloscope – Basic Principle, Block Diagram, Simple CRO,Dual Beam and Dual Trace – Sampling ,Storage and Digital Storage oscilloscope –Seven segment and dot matrix display – X-Y recorders – Magnetic tape recorders – Digital recording and data loggers.

UNIT III WAVE ANALYZERS AND SIGNAL GENERATORS  9

UNIT IV RS 232 AND RS 485  9

UNIT V DATA ACQUISITION CARDS  9
DAQ Analog and Digital cards for VI applications – Requirements – General block diagram of DAQ - Design of digital voltmeters with transducer input – Design of ON/OFF controller for temperature control applications

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BE1603 PROCESS CONTROL

OBJECTIVES:
- To analyze the dynamics of process operations mathematically
- To analyze the characteristics of various controller
- To design the controller and to obtain the controller parameter
- To understand control schemes and analyze its performance
- To know about the final control element performance

UNIT I DYNAMICS OF PROCESS

UNIT II CHARACTERISTICS OF CONTROLLER
Control System parameter - Basic control action – Characteristics of Discontinuous controller modes – Two position mode – Multiposition mode – Floating controller mode - Characteristics of continuous controller - Proportional, Integral and Derivative control modes – Composite control modes – P+I, P+D and P+I+D control modes

UNIT III ANALOG CONTROLLER & TUNING
Electronic controllers to realize various control actions – Pneumatic Controllers - Simple performance criteria – IAE, ISE, ITAE and ¼ decay ratio – Tuning of controllers – Ziegler-Nichol’s method and Cohen Coon method.

UNIT IV CONTROL SYSTEMS WITH MULTIPLE LOOPS
Cascade control – Feed forward control – Ratio control – Selective control systems – Split range control – Adaptive and inferential control - Case study of control schemes of binary distillation column.

UNIT V FINAL CONTROL ELEMENT
Final control operation – Signal conversion - I/P converter – Pneumatic and electric actuators – Valve positioner – Control valves characteristics – Classification of control valves – Control valve sizing – Cavitations and flashing – Selection of control valves.

TEXT BOOKS

REFERENCES
BEI604    DIGITAL SIGNAL PROCESSING SYSTEMS       L T P C
                                      3  1  0  4

OBJECTIVES:
• To classify signals and systems & their mathematical representation.
• To analyse the discrete time systems.
• To study various transformation techniques & their computation.
• To study about filters and their design for digital implementation.
• To study about a programmable digital signal processor.

UNIT I   INTRODUCTION                     12

UNIT II  ANALYSIS OF DISCRETE TIME SYSTEM  12
Z-transform and its properties, inverse z-transforms; difference equation – Solution by z-transform, application to discrete systems - Stability analysis, frequency response – Convolution – Fourier transform of discrete sequence – Discrete Fourier series.

UNIT III DISCRETE FOURIER TRANSFORM & COMPUTATION 12
Introduction to DFT – DFT Properties – magnitude and phase representation- Computation of DFT using FFT algorithms – FFT algorithms using Radix-2- Decimation in Time and Decimation in Frequency algorithms –Butterfly structure(4 and 8 point)

UNIT IV  DESIGN OF DIGITAL FILTERS         12
FIR & IIR filter realization – Parallel & cascade forms. FIR design: Windowing Techniques – Need and choice of windows – Linear phase characteristics. IIR design: Analog filter design - Butterworth and Chebyshev approximations; digital design using impulse invariant and bilinear transformation - Warping, prewarping - Frequency transformation.

UNIT V  DIGITAL SIGNAL PROCESSORS        12
Architecture for signal processing – Van Neumann and Harvard architecture; Architecture and features of TMS 320C54 signal processing chip.

L: 45   T: 15   TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
5. Texas TMS 320C54X user manual (website).
BEI631 INDUSTRIAL INSTRUMENTATION AND TELEMETRY LABORATORY  

L T P C  
0 0 3 2  

OBJECTIVES:  
• To develop an understanding of measurement and calibration procedure, the methods of experimentation and analysis of experimental data for industrial process.  
• To promote teamwork  

LIST OF EXPERIMENTS:  
1. Determination of Discharge coefficient of Orifice plate and Venturi meter.  
3. Measurement of pH  
5. UV-Visible Spectrophotometer  
7. Pressure gauge calibration using Dead Weight Tester.  
8. Calibration of Rotameter  
9. Calibration of Thermocouple  
10. Measurement of vacuum pressure.  
12. Torque measurement  
13. Generation of Amplitude Modulation  
14. Generation of Frequency Modulation  
15. Generation of Pulse Amplitude Modulation  
16. Generation of Unit Impulse Signal and Sine Signal  

P: 45  TOTAL: 45 PERIODS
BEI632 COMPUTER CONTROL OF PROCESS LABORATORY  L T P C
0 0 3 2

OBJECTIVES:
- To strengthen the knowledge in Mathematical Modeling
- To strengthen the practical knowledge in process control
- To study the characteristics of Process Components

LIST OF EXPERIMENTS:
1. Dynamics of first and second order systems
2. Simulation of different order processes with and without transportation lag
3. Characteristics of various transmitter
4. Realization of on-off controller using operational amplifier
5. Realization of P+I+D controller using operational amplifier
6. Characteristics of control valve with and without positioner
7. Closed loop response of flow control loop
8. Closed loop response of level control loop
9. Closed loop response of temperature control loop
10. Closed loop response of pressure control loop
11. Tuning of controllers
12. Study of complex control system (ratio / cascade / feed forward)

P: 45  TOTAL: 45 PERIODS
BEI001 INDUSTRIAL DRIVES AND CONTROL

OBJECTIVES:
• To provide solid introduction of different types of power switching devices.
• To study the operation of rectifier, chopper and PWM inverter circuit
• To know the characteristics of DC and AC drives.

UNIT I POWER DEVICES

UNIT II CONVERTERS
Introduction to half wave, full wave and bridge rectifiers – Single phase – Half controlled and Fully controlled converters (R, RL, RLE load with and without freewheeling diode) – Three phase (semi converter and full converter) – Dual converters – Introduction to cycloconverters (single phase step up and step down cycloconverter and three phase cycloconverter) and ac controllers.

UNIT III INVERTER AND CHOPPER

UNIT IV DC AND AC DRIVES

UNIT V OTHER APPLICATIONS

L : 45 TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCES
BE1002 INDUSTRIAL DATA NETWORKS L T P C 3 0 0 3

OBJECTIVES:
- To understand basic data networks
- To learn the basic of inter networking
- To have adequate knowledge in various communication protocol.
- To study industrial data communication.

UNIT I DATA NETWORK FUNDAMENTALS 9
Network hierarchy and switching – Open System Interconnection model of ISO– TCP/IP- Data link control protocol: HDLC .Medium access control techniques: Token ring, CSMA/CD.

UNIT II INTER NETWORKING 9

UNIT III HART AND FIELDBUS 9

UNIT IV MODBUS and PROFIBUS PA/DP/FMS AND FF 9

UNIT V INDUSTRIAL ETHERNET AND WIRELESS COMMUNICATION 9

L : 45 TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCES
BEI003 METROLOGY  L T P C  3 0 0 3

OBJECTIVE:
• To uncovered the knowledge of mechanical gears, gauges and different techniques for LASER measurement and operation of CNC machine.

UNIT I BASIC CONCEPTS OF MEASUREMENTS  9
Need for measurement - Precision and Accuracy - Reliability - Errors in Measurements – Types – Causes.

UNIT II LINEAR AND ANGULAR MEASUREMENTS  9

UNIT III FORM MEASUREMENTS  9

UNIT IV LASER METROLOGY  9

UNIT V ADVANCES IN METROLOGY  9

L : 45 TOTAL : 45 PERIODS

TEXT BOOK

REFERENCES
BEI004  MECHATRONICS  

OBJECTIVES:
- To study about basic definitions and introduction of Mechatronics.
- To study about different Sensors and Transducers in Mechatronic Applications.
- To study about different types of Actuation Systems.
- To study about different Controlling Techniques in Control Systems and PLC Programming.
- To study about recent advances in Industries.

UNIT I  INTRODUCTION  
Mechatronics – definition and key issues – evolution – basic elements – Mechatronics approach to modern engineering design.

UNIT II  SENSORS AND TRANSDUCERS  

UNIT III  ACTUATION SYSTEMS  

UNIT IV  CONTROL SYSTEMS  
Closed Loop Controllers: Two Step Mode, Proportional Control, Derivative Control, Integral Control, PID Controller – Programmable Logic Controllers: Basic Structure, Programming, Logic Functions, Latching, Sequencing, Timers, Counters.

UNIT V  RECENT ADVANCES  
Temperature measurement system and Domestic Washing Machine using Microcontroller – Pick and Place Robot – Car Park barriers – Automatic Digital Camera – Car Engine Management System – Barcode Reader – Medical Mechatronics with MRI.

L : 45 TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCES
BEI005 MICRO ELECTRO MECHANICAL SYSTEMS (Common to EIE & ECE) L T P C 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

UNIT II MICRO FABRICATIONS AND MICROMACHINING
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
Resonant sensor, Vibratory gyroscope, Capacitive and Piezo Resistive Pressure sensors, Piezo Resistive accelerometer, Acoustic devices and SQUIDs

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

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

TEXT BOOKS

REFERENCES
BE1006  VLSI SYSTEM DESIGN  

L T P C  3 0 0 3

OBJECTIVES:

- To introduce MOS theory / Manufacturing Technology.
- To study inverter / counter logic / stick / machine diagram / sequential circuits.
- To study adders / memory / arithmetic circuits.
- To introduce FPGA architecture / principles / system design.
- To get familiarised with VHDL programming behavioral/Structural/concurrent/ process.

UNIT I  BASIC MOS TRANSISTOR  

Enhancement mode and Depletion mode – Fabrication (NMOS, PMOS, CMOS, BiCMOS) Technology – NMOS transistor current equation – Second order effects – MOS Transistor Model.

UNIT II  NMOS AND CMOS INVERTER AND GATES  

NMOS and CMOS inverter – Determination of pull up / pull down ratios – Stick diagram – lambda based rules – Super buffers – Pass transistor logic, static and dynamic CMOS logic.

UNIT III  SUB-SYSTEM DESIGN AND LAYOUT  

Structured design of combinational circuits – parity generator-bus arbitration logic-multiplexers-gray to binary code converter– Tally circuits – NAND-NAND, NOR-NOR and AOI logic – EXOR structure – Multiplexer structures – Barrel shifter, high speed adder (Ripple Carry Adder, Carry Select Adder, Carry Skip Adder, Carry Look ahead Adder) and multiplier circuits (Array multiplier, Dadda Multiplier, Wallace tree multiplier).

UNIT IV  DESIGN OF COMBINATIONAL ELEMENTS AND REGULAR ARRAY

LOGIC

NMOS PLA (NAND-NAND,NOR-NOR) – Programmable Logic Devices (FPLA, PROM, PAL, Dynamic Logic array) - Finite State Machine PLA – Introduction to FPGA, CPLD.

UNIT V  VHDL PROGRAMMING  


L : 45 TOTAL : 45 PERIODS

TEXT BOOKS


REFERENCES

BE1007 DIGITAL CONTROL SYSTEM L T P C 3 0 0 3

OBJECTIVES:
• To study the importance of sample data control system.
• To give adequate knowledge about signal processing in digital control.
• To study the importance of modeling of discrete systems and stability analysis of discrete data system.
• To study the importance of state space representation for discrete data system.
• To introduce the design concept for digital controllers.

UNIT I  COMPUTER CONTROLLED SYSTEM 9

UNIT II  SIGNAL PROCESSING IN DIGITAL CONTROL 9
Sampling process – Frequency domain analysis – ideal samples – Shanon’s sampling theorem – generation and solution of process – linear difference equations – data reconstruction process – frequency domain characteristics.

UNIT III  DISCRETE SYSTEM MODELLING 9
Determination of the z transform – mapping between s and z domains - z transform of system equations – open loop Hybrid sampled Data Control Systems – open loop discrete Input Data Control System – closed loop sampled data control system – modified z transform method – response between sampling instants – stability on the z - plane and jury’s stability test – steady state error analysis for stable systems.

UNIT IV  STATE VARIABLE ANALYSIS OF DIGITAL CONTROL SYSTEMS 9

UNIT V  DIGITAL CONTROL 9
Digital PI, PD and PID Controller – Position and velocity forms – state regulator design – design of state observers – dead beat control by state feed back and dead beat observers.

L : 45 TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCES
BIT005    VISUAL PROGRAMMING      L T P C  
3  0  0  3

OBJECTIVES:
• To study the concepts of visual programming using VC++.
• To understand the ActiveX controls.
• To learn about window programming, dialog and menu controls.

UNIT I    VISUAL PROGRAMMING FUNDAMENTALS

UNIT II    DIALOGS AND CONTROLS
Working with Dialogs and Controls – Modal and Modeless Dialog – Property – Data I/O – Sound –
Timer – Spin buttons.

UNIT III   ADVANCED WINDOW PROGRAMMING
Memory management – SDI – MDI – MFC for Advanced windows user Interface – status bar and
Toolbars – Tree view – List view – Threads.

UNIT IV    RESOURCE MANAGEMENT
ODBC – MFC Database classes – DAO - DLLs – Working with Images and Videos.

UNIT V    APPLICATION DOMAINS
File Handling - File System Controls - File System Objects - COM/OLE Fundamentals – ActiveX
control – ATL – Internet Programming.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS
1. Ivor Horton,“Ivor Horton's Beginning Visual C++ 2010 (Wrox Programmer to Programmer)”,

REFERENCES
BGE001  ORGANIZATIONAL BEHAVIOUR  L T P C
3 0 0 3

OBJECTIVES:
- To provide a basic knowledge of main ideas and key theories relating to organizational behaviour
- To develop an understanding of these and related ideas and concepts.
- To develop an interest in, an appreciation of, and a positive attitude toward the many aspects of the subject matter of management.

UNIT I  FOCUS AND PURPOSE  5
Definition, need and importance of organizational behaviour – Nature and scope –Framework – Organizational behaviour models

UNIT II  INDIVIDUAL BEHAVIOUR  12

UNIT III  GROUP BEHAVIOUR  10

UNIT IV  LEADERSHIP AND POWER  8

UNIT V  DYNAMICS OF ORGANIZATIONAL BEHAVIOUR  10

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
**BEI701 EMBEDDED SYSTEMS AND PROGRAMMING**

**L T P C**

3 1 0 4

**OBJECTIVES**

- To describe the general principles of the microprocessor architecture
- To describe the general process of embedded system development and important embedded system terminologies
- To outline Systems Software Development, device driver development and the operating system concepts.
- To distinguish real time tasks and scheduling concepts.
- To create program for embedded systems.

**UNIT I INTRODUCTION TO MICROPROCESSOR ARCHITECTURE**

Introduction-Instruction Word Formats-Representation of Instructions and Data-Addressing Techniques-Direct addressing-Immediate addressing-Relative addressing-Indirect addressing-Indexed addressing-Branch and Jump Instructions-Branch and Jump Instructions-Flags – Condition Codes-Status Registers-Subroutine Calls-Interrupts-Storage Hierarchies-Virtual memory-Cache Memory-Pipelined Computers-RISC and CISC Architecture

**UNIT II INTRODUCTION TO EMBEDDED SYSTEM**


**UNIT III SOFTWARE DESIGN ASPECTS**


**UNIT IV REAL TIME OPERATING SYSTEM**

Real time Tasks-Real time systems-Types of Real time Tasks-Real time Operating Systems-Real time Scheduling Algorithms-Rate Monotonic Algorithm-The Earliest Deadline First Algorithm-Qualities of a Good RTOS-Device Drivers-Codes/Pseudo Codes for OS Functions-A Survey of contemporary Real time Operating systems : PSOS, VRTX, QNX-Benchmarking Real time systems – Basics

**UNIT V PROGRAMMING IN EMBEDDED C**

Getting the Most out of C: Integer Data Types-Mixing Data Types-Useful Typesets -Manipulating Bits in Memory-Manipulating Bits in I/O Ports-Accessing Memory Mapped I/O Devices-Structures -Variant Access-Mixing C and Assembly: Programming in Assembly-Register Usage Conventions-Typical Use of Addressing Options-Instruction Sequencing-Procedure Call and Return-Parameter Passing-Retiieving Parameters-Embedded C-PIC programming using MPLAB.

**TEXT BOOKS**


**REFERENCES**

BEI702 VIRTUAL INSTRUMENTATION 3 0 0 3

OBJECTIVES
• To comprehend the basic building blocks of virtual instrumentation
• To identify salient traits of a virtual instrument and incorporate these traits in their Projects.
• To acquire knowledge on how virtual instrumentation can be applied for Control and instrumentation.
• To analyze and document in the laboratory prototype measurement systems using DAQ interfaces.

UNIT I VIRTUAL INSTRUMENTATION 9
Review of quantization in amplitude and time axis, Historical perspective, advantages, block diagram and architecture of a virtual instrument, graphical programming in data flow, comparison with conventional programming, Tools and other palettes, PC Based data acquisition, Basics of LabVIEW.

UNIT II FUNDAMENTALS OF VIRTUAL INSTRUMENTATION 9
Concepts of graphical programming – Lab-view software – Concept of VIs and sub VIs – Display types, FOR and while loops – additional loop problem, local variables, global variables – Other structures – sequence, case, formula node, event structure, graphs and charts.

UNIT III GRAPHICAL PROGRAMMING ENVIRONMENT IN VI 9
Arrays and clusters – Inter conversion of arrays and clusters, file input / output – file formats, file input/output functions, path functions, VI s to demonstrate File Write and Read,string handling – string functions, parsing of strings.

UNIT IV INTERFACING INSTRUMENTS 9

UNIT V ANALYSIS TOOLS AND SIMPLE APPLICATION IN VI 9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEI703  LOGIC AND DISTRIBUTED CONTROL SYSTEM  L T P C  3 1 0 4

OBJECTIVES

• To study the fundamentals of PLC.
• To understand the basic construction in PLC.
• To study the application of PLC.
• To understand the basic of DCS and Interfaces.

UNIT I  PROGRAMMABLE LOGIC CONTROLLER  12
Evolution of PLC’s – Components of PLC – Advantages over relay logic – Architecture of PLC–
Programming devices - Discrete and Analog I/O modules – Programming languages - Ladder diagram
– Programming timers and counters – Design of PLC.

UNIT II  INSTRUCTION IN PLC  12
Instructions in PLC – Program control instructions, math instructions, Data manipulation instructions,
sequencer instructions – Use of PC as PLC – PLC to PC interfacing – PLC to PLC interfacing.

UNIT III  APPLICATIONS OF PLC  12
PLC Installation Practices - Editing and Troubleshooting – Data acquisitions system - Application of
PLC - Case study of bottle filling system, traffic light control system –PLC in Cement industry -
Programming concept in Allen Bradely PLC and Siemens PLC.

UNIT IV  DISTRIBUTED CONTROL SYSTEM  12
DCS –Evolution of Architectures – Comparison – Local control unit – Process interfacing issues -
Communication facilities.

UNIT V  INTERFACES IN DCS  12
Operator interfaces - Low level and high level operator interfaces – Operator displays - Engineering
interfaces – Low level and high level engineering interfaces – General purpose computers in DCS.

L: 45  T: 15  TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES

WEB
http://www.industry.usa.siemens.com/automation/us/en/process-control-system/pas-white-
papers/Documents/dcsand-plc-cement.pdf
BMG601 PRINCIPLES OF MANAGEMENT

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

UNIT II MANAGERS AND ENVIRONMENT

UNIT III FUNCTIONAL AREA OF ORGANISATION

UNIT IV MOTIVATION AND DIRECTIONS

UNIT V CONTROLLING STRATEGIES

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEI731 LOGIC AND DISTRIBUTED CONTROL SYSTEM LABORATORY  L T P C
0 0 3 2

OBJECTIVES
- To apply the relay concept and PLC programming.
- To develop a ladder program for real time process.
- To develop the controller configuration in DCS.

LIST OF EXPERIMENTS
1. Design of Electronic On/Off controller with relay concept
2. Implementation of On Off controller using ELVIS
3. Micro-processor based temperature control system
4. Batch process control by Programmable Logic Controller
5. PLC controlled level process
6. Reaction vessel control using Programmable Logic Controller
7. Traffic light control Using Programmable Logic Controller
8. Bottle filling system controlled by Programmable Logic Controller
9. Computer controlled Closed loop response of Temperature process
10. Computer controlled Closed loop response of pressure process
11. Implementation of Controller for Pressure and Temperature process in Distributed Control system
12. Automation of the Cement Plant and Beverage Plant using Distributed Control system

TOTAL: 45 PERIODS
BEI732 EMBEDDED SYSTEMS AND VIRTUAL INSTRUMENTATION LABORATORY

OBJECTIVES
- To learn Interfacing concepts, using PIC
- To learn combinational circuits using FPGA
- To acquire basic knowledge in VI building blocks

EMBEDDED SYSTEM EXPERIMENTS
1. Study of PIC development board
2. Interfacing keyboard, LCD, seven segment LED using PIC.
3. Design of combinational circuits in FPGA.
   - Encoder, decoder, adder, subtractor, multiplexer, demultiplexer, code converters
4. Design and implementation of traffic light controller using FPGA.
5. Control scheme for a Temperature Process using PIC.

VI EXPERIMENTS
1. Creating Virtual Instrumentation for simple applications
2. Programming exercises for Loops and Charts
4. Programming exercises on Case and Sequence Structures,
6. Developing voltmeter using DAQ cards.
7. Developing signal generator using DAQ cards.
8. Real time temperature control using Virtual Instrumentation.

TOTAL: 45 PERIODS
OBJECTIVE

- To provide opportunity for the student to apply the knowledge acquired during the academic programme to real – life problems that he/she may have to face in future as an engineer.

Two periods per week shall be allotted in the time table for the activity and this time shall be utilized by the student to receive guidance from the members of faculty on solving real-life problems, practice solving these problems and on group discussions, seminar presentations, library reading as assigned by the faculty member in-charge. The continuous assessment and end semester evaluation may be carried out as specified in the guidelines to be issued from time to time, for which.

1. Two written tests of objective type question from the courses up to 6th semester may be conducted.
2. Seminars on latest topics may be conducted
3. Oral Exams on G.K, Technical knowledge, reasoning, may be conducted
4. Group discussions may be conducted

TOTAL: 45 PERIODS
OBJECTIVES

- To describe the basic concepts of optical fibres and their properties.
- To illustrate principles of optical fibres in Industrial applications.
- To understand Industrial application and Medical applications in Lasers.

UNIT I  OPTICAL FIBRES AND THEIR PROPERTIES  
Principles of light propagation through a fibre - Different types of fibres and their properties, fibre characteristics - Absorption losses - Scattering losses - Dispersion - Connectors and splicers – Fibre termination - Optical sources – Optical detectors.

UNIT II  INDUSTRIAL APPLICATION OF OPTICAL FIBRES  

UNIT III  LASER FUNDAMENTALS  

UNIT IV  INDUSTRIAL APPLICATION OF LASERS  
Laser for measurement of distance, length, velocity, acceleration, current, voltage and Atmospheric effect – Material processing – Laser heating, welding, melting and trimming of material – Removal and vaporization.

UNIT V  HOLOGRAM AND MEDICAL APPLICATIONS  

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
**BEI022 IMAGE PROCESSING**

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**OBJECTIVES**

- To describe the fundamentals of image processing.
- To explain the various image enhancement techniques.
- To explain various image compression standards.
- To develop applications of image processing.

**UNIT I FUNDAMENTALS OF IMAGE PROCESSING**


**UNIT II IMAGE ENHANCEMENT**


**UNIT III IMAGE SEGMENTATION AND FEATURE ANALYSIS**


**UNIT IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS**


**UNIT V REPRESENTATION, DESCRIPTION AND APPLICATION**


**TOTAL: 45 PERIODS**

**TEXT BOOKS**


**REFERENCES**

BEI023    APPLIED SOFT COMPUTING      L    T    P    C
                                      3    0    0    3

OBJECTIVES

• To familiarize with Soft Computing concepts.
• To describe the basic concepts of Artificial Neural Networks.
• To understand the fundamental concepts of Fuzzy Logic System.
• To introduce the concepts of genetic algorithm.
• To study about the applications of Artificial Neural Network, Fuzzy Logic system and Genetic Algorithm.

UNIT I    INTRODUCTION TO SOFT COMPUTING      9
Evolution of Computing - From Conventional AI to Computational Intelligence - Architecture for intelligent control - rule-based system - Knowledge representation - Expert system.

UNIT II    ARTIFICIAL NEURAL NETWORKS       9
Fundamentals of Artificial Neural Networks- Basic mathematical model and McCulloch-Pitts neuron model – single layer perceptron- Feed-forward Multilayer Perceptron -Supervised and unsupervised learning approaches- Neural Network based controller.

UNIT III    FUZZY LOGIC SYSTEM          9

UNIT IV    GENETIC ALGORITHM          9
Gradient Search – Non-gradient search - Genetic algorithm- Genetic operators- Encoding- Binary, Octal, Hexadecimal-Decoding-Fitness Function- Selection-Roulette-wheel, Tournament, Rank and Steady-state- Crossover-Single-Point, Two Point, Multi-Point, Uniform- Cross Over Rate-Mutation.

UNIT V    APPLICATIONS             9
Neural network controller for inverted pendulum - Fuzzy logic controller for inverted pendulum - Home heating system- Introduction to Neuro-fuzzy systems – Case study: Optimization Algorithm- Tabu search and Ant-colony search techniques for solving optimization problems.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEI024   SENSOR NETWORKS         L T P C  
                                     3 0 0 3

OBJECTIVES

• To understand the fundamental concepts of wireless and sensor networks.
• To develop simple wireless sensor network applications using actual motes and sensor devices.
• To understand and explain protocol design issues and protocol designs for wireless sensor networks.
• To set up and evaluate measurements of protocol performance in wireless sensor networks.

UNIT I  INTRODUCTION   9
Introduction to Sensor Networks, unique constraints and challenges, Advantage of Sensor Networks, 
Sensor Networks Application, Sensor node technology, Sensor Taxonomy, wireless network 
operating environment, Tracking multiple objects, sensor models.

UNIT II   SENSOR NODE HARDWARE AND NETWORK ARCHITECTURE   9
Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating 
Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, 
Optimization Goals and Figures of Merit, Design principles for WSN, service interface of WSN, Gateway.

UNIT III  COMMUNICATION PROTOCOLS   9
Physical layer, MAC Protocols- Fundamentals, S-MAC Protocol, IEEE 802.15.4 standard, Link layer 
protocol-error control, framing, link management, Routing Protocols- Energy-Efficient Routing, 
Geographic Routing.

UNIT IV  DEPLOYMENT AND CONFIGURATION   9
Naming and Addressing-Assignment of MAC address, content based and geographic addressing, 
Localization and positioning- Single-hop and multihop localization, Coverage and deployment.

UNIT V   SENSOR SECURITY AND NETWORK TOOLS   9
Security architecture, Cell based WSNs, Privacy of local information, Security Protocols in Sensor 
Networks, Communication Security in Sensor Networks, Sensor Node Hardware – Berkeley Motes, 
Sensor network Programming Challenges, Node-level software platforms, Node-level Simulators, 
State-centric programming.

TOTAL: 45 PERIODS

TEXT BOOKS
   13-978-1-55860-914-3).

REFERENCES
BEI025 TESTING AND CALIBRATION OF INSTRUMENTS  

OBJECTIVES

- To define key terms related to calibration and interpret the meaning of each.
- To list the various methods used in a calibration procedure.
- To select the proper calibration procedure.
- To calibrate the different type of instruments and determine acceptability.

UNIT I INTRODUCTION TO TESTING AND CALIBRATION  

UNIT II TEST MEASUREMENT INSTRUMENTATION  

UNIT III TESTING OF INSTRUMENTS  
Voltage-Voltmeter, Current - Ammeter and Resistance - Ohmmeter, Temperature - Thermocouple, Pressure - Primary pressure sensing elements-Diaphragm, Bourdon tube

UNIT IV CALIBRATION REQUIREMENTS  
Calibration procedure, calibration procedure content, calibration datasheet, P&IDs, loop diagrams, Instrument Specification Forms, Project Specifications, Manufacturer’s Specifications, Calibration Intervals, Safety Considerations, Calibration Status Labels

UNIT V CALIBRATION SERVICES  
National Measurement Standard Laboratories, Commercial Calibration Services, In-House Calibration, Modern techniques, standards in different National Laboratories and Bureaus, calibration management and maintenance

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVES

• To differentiate the Non destructive testing from destructive testing techniques.
• To understand the fundamentals and principles involved in the various Non destructive testing.
• To describe the procedures used to perform basic NDT techniques.
• To discuss the advantages and limitations of one method over other methods.
• To critically appraise the NDT techniques available and to select the most appropriate one for a given situation/application.

UNIT I VISUAL INSPECTION AND LIQUID PENETRANT TESTING

Introduction: Comparison of Destructive and Non-Destructive Tests-Conditions for Effective Non-Destructive Testing
Visual Inspection:-Optical aids used for visual Inspection-Applications

UNIT II ULTRASONIC AND ACOUSTIC EMISSION TESTING


UNIT III MAGNETIC PARTICLE, EDDY CURRENT AND MAGNETIC FLUX LEAKAGE TESTING

Magnetic Particle Testing: Principle- magnetizing techniques- Procedure used for testing a component –Advantages, Limitations and applications

UNIT IV THERMOGRAPHY AND RADIOGRAPHY TESTING

Thermography: Principle- Detectors and Equipments for active thermography –heating sources – applications-Thermal imaging for condition monitoring of Industrial Components

UNIT V INDUSTRIAL APPLICATIONS OF NON-DESTRUCTIVE TESTING

Industrial Applications of Non Destructive Testing: Railways- Nuclear industry –chemical industry -aircraft and aerospace industries –automotive industries-Selection of NDT methods –Codes, standards, specifications and Procedures.

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES

BME014 FUNDAMENTALS OF NANO TECHNOLOGY L T P C 3 0 0 3

OBJECTIVE
- To study the basics and important applications of nanotechnology.

UNIT I INTRODUCTION 10
Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering- Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II PREPARATION METHODS 10
Bottom-up Synthesis-Top-down Approach: Precipitation, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III PATTERNING AND LITHOGRAPHY FOR NANOSCALE DEVICES 5
Introduction to optical/UV electron beam and X-ray Lithography systems and processes, Wet etching, dry (Plasma/reactive ion) etching, Etch resists-dip pen lithography

UNIT IV PREPARATION ENVIRONMENTS 10
Clean rooms: specifications and design, air and water purity, requirements for particular processes, Vibration free environments: Services and facilities required. Working practices, sample cleaning, Chemical purification, chemical and biological contamination, Safety issues, flammable and toxic hazards, biohazards.

UNIT V CHARACTERIZATION TECHNIQUES 10
X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
**BMA001  NUMERICAL METHODS WITH PROGRAMMING IN C FOR ENGINEERS**

**OBJECTIVES**

On the successful completion of this course, the students should be able to

- Solve algebraic and transcendental equations using numerical methods
- Interpolate the given data and find the extremum
- Perform integration when the function is given by means of tabular values
- Solve the ordinary and partial differential equations by various methods numerically

**UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS**

Solution of equation:- Iteration method – Newton Raphson method-Solution of system of linear equations by Gaussian elimination and Gauss-Jordan method ; Iterative methods-Gauss-Jacobi and Gauss-Seidel; Programming for Newton Raphson, Gaussian elimination and Gauss-Seidel methods in C.

**UNIT II INTERPOLATION**

Newtons’s forward and backward interpolation formulae-Gauss Forward and Backward difference formulae – Lagrange’s interpolation formula –Newton’s divided difference formula; Programming for Lagrange’s interpolation formula and Newton’s divided difference formula in C.

**UNIT III NUMERICAL INTEGRATION**

Numerical integration by trapezoidal and Simpson’s 1/3 and 3/8 rules–Romberg’s method- Two and Three point Gaussian quadrature formulae – Double integrals using trapezoidal and Simpson’s rules; Programming for trapezoidal and Simpson’s rules in C.

**UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS**


**UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS**

Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**


**REFERENCES**

BGE002 INDUSTRIAL SAFETY ENGINEERING

L T P C 3 0 0 3

OBJECTIVE

- To understand the basic concepts and principles in the area of Safety, health and hazards

UNIT I ACCIDENT INVESTIGATION AND ANALYSIS

Concept of an Accident, reportable and non-reportable accidents, reporting to statutory authorities. Principles of accident prevention - accident investigation and analysis - Unsafe act and unsafe condition - Domino sequence - cost of accidents - permanent total disabilities, Permanent partial disabilities, Temporary total disabilities - Calculation of frequency rate and severity rate of accidents.

UNIT II ERGONOMICS AND HUMAN BEHAVIOUR


UNIT III HAZARDS AND THEIR CONTROL

Physical hazards - Noise, heat, vibration, ionizing and non-ionizing radiations, and effects. Chemical hazards - dusts, fumes, mist, vapor, fog, gases, types, concentration, exposure vs. dose, TLV. Mechanical hazards. Engineering control methods - use of personal protective equipment's.

UNIT IV FIRE PREVENTION AND PROTECTION

Fire triangle - principles of fire extinguishing - various classes of fires - A, B, C, D types of fire extinguishers - Industrial fire protection systems. Sprinklers - Fire hydrants - Alarm and detection systems - other suppression systems - CO₂ system, foam system and DCP system.

UNIT V SAFETY MANAGEMENT TECHNIQUES, EDUCATION AND TRAINING


TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

BEI801  POWER PLANT INSTRUMENTATION  L  T  P  C  3  0  0  3

OBJECTIVES

- To describe the basic concepts of instrumentation to control the boiler parameters.
- To apply the knowledge of power plant instrumentation to control the boiler parameters.
- To analyze the different types of devices used in power plants.
- To interpret the different types of controls and control loops.

UNIT I  OVERVIEW OF POWER GENERATION  9
Importance of instrumentation in power generation - Thermal power plants – Basic building blocks - P&I diagram –Overview of other methods of power generation – hydro, nuclear, solar and wind power– cogeneration.

UNIT II  MEASUREMENTS IN POWER PLANTS  9
Electrical measurements – current, voltage, power, frequency, power factor etc. – nonelectrical parameters – flow of feed water, fuel, air and steam with correction factor for temperature – steam pressure and steam temperature – drum level measurement – radiation detector – smoke density measurement – dust monitor.

UNIT III  ANALYZERS IN POWER PLANTS  9

UNIT IV  CONTROL LOOPS IN BOILER AND TURBINE  9
Feed water control-Steam pressure control -Combustion control – air/fuel ratio control – furnace draft control – drum level control –super heater control –Intristic and electrical Safety- interlocks in boiler operation.
Turbine monitoring and control: speed, vibration, shell temperature monitoring.

UNIT V  NUCLEAR POWER PLANT INSTRUMENTATION  9
Piping and instrumentation diagram of different types of nuclear power plant -radiation detection instruments -process sensors for nuclear power plants -spectrum analyzers --nuclear reactor control systems and allied instrumentation.

TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

BE1802 BIOMEDICAL INSTRUMENTATION  
(Common to EIE, EEE)  
L T P C  3 0 0 3

OBJECTIVES
• To introduce the various sensing and measurement related to Biomedical instrumentation.
• To bring out the important and modern method of imaging equipments.
• To provide latest knowledge of medical assistance / technique and therapeutic equipments.

UNIT I      PHYSIOLOGY AND TRANSDUCERS  9

UNIT II     ELECTRO-PHYSIOLOGICAL MEASUREMENT  9

UNIT III   NON-ELECTRICAL PARAMETER MEASUREMENT  9

UNIT IV     MEDICAL IMAGING AND TELEMETRY  9

UNIT V     ASSISTING AND THERAPEUTIC DEVICES  9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEI041  PC BASED INSTRUMENTATION  L T P C
3 0 0 3

OBJECTIVES
• To recall different types of Sensors and actuators.
• To adequately knowledge in various Protocols.
• To understand various Data networks.

UNIT I  INTRODUCTION

UNIT II  HARDWARE ORGANISATION OF IBM PC
Motherboard components-System resources- Interrupt Request lines, DMA Channels, I/O space, Utilization of System Resources, Peripheral control chips, Expansion buses and I/O ports, Peripherals.

UNIT III  PRINCIPLES OF DATA ACQUISITION AND INTERFACING
Sampling concepts, Data Acquisition Configurations, Expansion Buses-ISA, EISA, PCI. Parallel port, Plug-in Boards, Data Acquisition using GPIB-Overview of GPIB,GPIB Commands, GPIB programming.

UNIT IV  DATA ACQUISITION USING SERIAL INTERFACES

UNIT V  NETWORKED DATA ACQUISITION
Network Data communication, local Area Networks-OSI Model, LAN Characteristics, TCP/IP, Wireless LAN,HART communication, PC based data - Acquisition systems - Industrial process measurements like flow, temperature, Pressure, and level PC based instruments development system.

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
OBJECTIVES

• To introduce the various system in the Aircraft.
• To provide the auxiliary system in the Aircraft system.
• To provide the instruments used in Aircraft.

UNIT I  AIRPLANE CONTROL SYSTEMS
Conventional Systems - fully powered flight controls - Power actuated systems – Modern control systems - Digital fly by wire systems - Auto pilot system active control Technology.

UNIT II  AIRCRAFT SYSTEMS
Hydraulic systems - Study of typical workable system - components - Pneumatic systems - Advantages - Working principles - Typical Air pressure system – Brake system - Typical Pneumatic power system - Components, Landing Gear systems – Classification.

UNIT III  ENGINE SYSTEMS
Fuel systems for Piston and jet engines - Components of multi engines. Lubricating systems for piston and jet engines - Starting and Ignition systems - Typical examples for piston and jet engines.

UNIT IV  AUXILIARY SYSTEM
Basic Air cycle systems - Vapour Cycle systems, Evaporative vapour cycle systems - Evaporative air cycle systems - Fire protection systems, Deicing and anti icing systems.

UNIT V  INSTRUMENTS

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEI043 ADVANCED PROCESS CONTROL L T P C
3 0 0 3

OBJECTIVES

• To describe the linear control theory and its applications in conventional control process.
• To analyze and categorize the process by discrete method.
• To develop advanced controller for real time process.

UNIT I ELEMENTS OF COMPUTER PROCESS CONTROL


UNIT II DISCRETIZATION OF THE PROCESS

The Z Transformation: Z Transform of Various Functions - Properties of Z Transforms - The Inverse Z Transformation-Pulse Transfer Functions :Complex Series Representation of the Sampler - Development of the Pulse Transfer Function-Data Holds : Transfer Function of the Zero - Order Hold - Transfer Function of the First-Order Hold-Sampling Frequency Considerations - Selection of Optimum Sampling Period

UNIT III ANALYSIS OF SAMPLED DATA SYSTEM


UNIT IV DESIGN OF ADVANCED CONTROL SCHEMES


UNIT V ADVANCED CONTROL SCHEMES


TOTAL: 45 PERIODS

TEXT BOOK


REFERENCES

BEI044   INDUSTRIAL AUTOMATION AND CONTROL       L T P C  
3 0 0 3

OBJECTIVES

- To describe different process in Petrochemical, Iron & Steel Industries.
- To understand different controls in Chemical Reactors.
- To discuss Special application in Process Industries.

UNIT I   PETROCHEMICAL INTRODUCTION
Petroleum Exploration, Production and Refining - Constituents of Crude Oil. P & I diagram of petroleum refinery – Atmospheric and Vacuum Distillation of Crude oil Thermal Conversion process – Control of Distillation Column – Temperature and Pressure Control – Feed control, Reflux Control, Reboiler Control

UNIT II   CONTROLS OF CHEMICAL REACTORS

UNIT III   IRON AND STEEL
The need for iron and steel in the civilised world; history of steel making – Process description in diagrammatic and functional block details; raw materials reparation; operation of Blast Furnace (BF) and auxiliary units including stoves; Basic oxygen Furnace (BOF); Electric Furnace (EF); Open Hearth Furnace (OHF); relative merits of various steel making furnaces.

UNIT IV   QUALITY OF STEEL
Impurities present and allowed limits for usable steel; waste recycling, casting of steel; primary and secondary rolling, cold rolling; steel finishing operations. Identification of various process parameters in the industry; weighing and proportioning; special gauges for measurement of thickness and shape.

UNIT V   SPECIAL APPLICATIONS FOR CONTROLS
Blast Furnace, Stove combustion control system; gas and water control system in Basic Oxygen Furnace; Mould Level control system in Sand Casting operations. Evolution of computer applications in the industry; Practices for model calculating and data logging; steel rolling mill control; annealing process control; utilities management with computer system.

TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

BEI045  ROBOTICS AND AUTOMATION  
(Common to EIE, EEE)  
L  T  P  C  3  0  0  3

OBJECTIVES
- To describe the fundamental of robotics, various types of industrial sensors and sources.
- To analyze and perform kinematics of robot systems.
- To understand the control of robots using programming languages.
- To demonstrate the function of robot and automation in industrial activities.

UNIT I  INTRODUCTION  
9
Fundamental concepts of robotics: robotics and automation – robot anatomy – types of robotics
Asimov’s laws of robotics - robot coordinates and control system, specification of Robots: Resolution,
Repeatability, Accuracy, degrees of freedom and speed.

UNIT II  SENSORS AND POWER SOURCES  
9
Internal state sensors: position sensors and velocity sensors - External state sensors: contact type –
Tactile sensors and Force/Torque sensors, Non-contact type: Visual sensors and Proximity/Range
sensors - Hydraulic, Pneumatic and Electric drives - Determination of HP of motor and gearing ratio -
power transmission systems and control.

UNIT III  MANIPULATORS AND GRIPPERS  
9
Manipulators: Manipulator Dynamic and Force Control - Electronic and Pneumatic manipulators –
manipulator control circuits, Types of End Effector: Mechanical gripper and gripper mechanism - end
effector interfaces - Design consideration.

UNIT IV  KINEMATICS AND PATH PLANNING  
9
Homogeneous coordinates, Homogeneous transformation and manipulator, Forward and Inverse
Kinematic problems, Solutions of Inverse Kinematic problems, Jacobian control –Hill climbing
techniques - Robot programming languages

UNIT V  CASE STUDIES  
9
Multiple robots, Machine interface, Robots in manufacturing and non manufacturing applications,
Robot cell design, Selection of robot.

TOTAL: 45 PERIODS

TEXT BOOKS
India / Pearson Education, Asia, second edition 2010.

REFERENCES
BEI046 MEDICAL INFORMATICS

OBJECTIVES

- To explore the scopes of computers’ use in Hospitals and clinical management.
- To effectively use the computers in diagnostic and therapeutical devices.

UNIT I INTRODUCTION

History and Structure of Medical Informatics – Internet and Medicine -Security issues, Computer based medical information retrieval, Hospital management and information system, Functional capabilities of a computerized HIS, e-health services, Health Informatics – Medical Informatics, Bioinformatics

UNIT II CIS and CPR

Introduction – Benefits of CIS – Sources of data for decision making – Modes of decision output to physician – CIS in Obstetrics-Gynecology – Clinical decision support – CPR introduction – History - taking by computer – Dialogue with the computer.

UNIT III COMPUTERS IN CLINICAL LABORATORY AND MEDICAL IMAGING

Automated clinical laboratories-Automated methods in hematology, cytology and histology, Intelligent Laboratory Information System - Computerized ECG, EEG and EMG, Computer assisted medical imaging- nuclear medicine, ultrasound imaging ultrasonography-computed X-ray tomography, Radiation therapy and planning.

UNIT IV COMPUTER ASSISTED MEDICAL DECISION-MAKING

Neuro computers and Artificial Neural Networks application, Expert system – General model of CMD, Computer –assisted decision support system-production rule system cognitive model, semantic networks, decisions analysis in clinical medicine-computers in the care of critically patients-computer assisted surgery-Robotics

UNIT V RECENT TRENDS IN MEDICAL INFORMATICS

Virtual reality applications in medicine, Telemedicine, Computer aids for the handicapped, computer assisted instrumentation in Medical Informatics - Computer assisted patient education and health care information.

TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

BEI047    AUTOMOTIVE INSTRUMENTATION AND CONTROL  L  T  P  C

OBJECTIVES

- To illustrate the working of panel meters used in automobile panels
- To describe the basic concepts of Indicating Instruments, Warning Instruments used in automobile panels
- To discuss the various Dashboard Amenities, Switching and Control devices.

UNIT I AUTOMOBILE PANEL METERS AND SENSOR DESIGN  9

UNIT II WARNING AND ALARM INSTRUMENTS  9
Brake Actuation Warning System, Trafficators, Flash System, Oil Pressure Warning System, Engine Overheat Warning System, Air Pressure Warning System, Speed Warning System, Door Lock Indicators, Gear Neutral Indicator, Horn Design, Permanent Magnet Horn, Air Horn, Music Horns

UNIT III DRIVELINE CONTROL  9
Basic driveline equations, Modeling of neutral gear, State-space formulation, Driveline speed control, Driveline control for gear shifting

UNIT IV VEHICLE MODELING  9
Vehicle modeling, wheel model, tyre characteristics, complete vehicle model, validation of the model, velocity estimation.

UNIT V VEHICLE CONTROL SYSTEM  9
Vehicle control system, Antilock Braking Systems (ABS), control cycles of ABS, road model, PID driver model, hybrid driver model, model of human information acquisition, complete driver model.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BEI048 INSTRUMENTATION IN PETROCHEMICAL INDUSTRIES  

L T P C  
3 0 0 3

OBJECTIVES

- To gain the prospective ideas about the unit operations in petroleum industry.
- To acquire knowledge pertaining to the petroleum products and the chemicals obtained from them.
- To attain knowledge in the measurement of various parameters in petrochemical industry.
- To comprehend the various control loops in Petrochemical Industry.

UNIT I PETROLEUM PROCESSING


UNIT II OPERATIONS IN PETROLEUM INDUSTRY

Thermal cracking – Catalytic cracking – Catalytic reforming – Polymerisation – Alklylation – Isomerization – Production of ethylene, acetylene and propylene from petroleum.

UNIT III CHEMICALS FROM PETROLEUM PRODUCTS


UNIT IV MEASUREMENTS IN PETROCHEMICAL INDUSTRY


Selection and maintenance of measuring instruments – Intrinsic safety of Instruments.

UNIT V CONTROL LOOPS IN PETROCHEMICAL INDUSTRY

Control loops of catalytic crackers and pyrolysis unit – Control loops of polyethylene production – Control loops of vinyl chloride production – Control loops of PVC production.

TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

BIT014    COMPUTER ARCHITECTURE     L  T  P  C
3  0  0 3

OBJECTIVES
Students will be able to
• Discuss the basic structure and operation of a digital computer.
• Design adders, ALUs, Multipliers, floating point units.
• Employ some of the techniques used to improve the performance of computer at the architectural point of view.
• Discuss several types of memory used in a computer their hierarchy and functions as part of the system.
• Explain the communication process with input and output devices and different mechanisms for interfacing with the peripheral units.

UNIT I  INSTRUCTION SET ARCHITECTURE      9
Introduction to computer architecture - Review of digital design – Instructions and addressing – procedures and data – assembly language programs – instruction set variations

UNIT II  ARITHMETIC/LOGIC UNIT       9
Number representation – design of adders – design of simple ALUs – design of Multipliers and dividers – design of floating point arithmetic unit

UNIT III  DATA PATH AND CONTROL        9
Instruction execution steps – control unit synthesis – microprogramming – pipelining – pipeline Performance

UNIT IV  MEMORY SYSTEM                   9
Main Memory concepts – types of memory – cache memory organization – secondary storage – virtual memory – paging

UNIT V  I/O AND INTERFACES             9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BMG701 TOTAL QUALITY MANAGEMENT

OBJECTIVES

- To introduce the principles of business and social excellence,
- To generate knowledge and skills of students to use models and quality management methodology for the implementation of total quality management in any sphere of business and public sector.

UNIT I INTRODUCTION
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

UNIT III TQM TOOLS & TECHNIQUES I

UNIT IV TQM TOOLS & TECHNIQUES II

UNIT V QUALITY SYSTEMS

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES