REGULATIONS – 2011

DEPARTMENT OF
CIVIL ENGINEERING

CURRICULUM AND SYLLABI OF
B.E. - CIVIL ENGINEERING
REGULATIONS 2011

CURRICULUM AND SYLLABI FOR FULL TIME

B.E. CIVIL ENGINEERING

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

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*Total Number of Credits: 29

- *Common to all B.E. / B.Tech. Programmes
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LIST OF ELECTIVES

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BEG101 TECHNICAL ENGLISH – I

UNIT I


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

UNIT II


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

UNIT III


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

UNIT IV

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

UNIT V

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

TOTAL: 60 PERIODS

AREAS TO BE COVERED UNDER DIFFERENT HEADINGS:

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

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

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

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

TEXT BOOK:

REFERENCES:

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

UNIT I      MATRICES
Characteristic equation – Eigen values and eigen vectors of a real matrix – Properties – Cayley-
Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal
form – Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT II     THREE DIMENSIONAL ANALYTICAL GEOMETRY

UNIT III    DIFFERENTIAL CALCULUS
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
Partial derivatives – Euler’s theorem for homogenous functions – Total derivatives – Differentiation
of implicit functions – Jacobians – Taylor’s expansion – Maxima and Minima – Method of
Lagrangian multipliers.

UNIT V      MULTIPLE INTEGRALS
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:
   (2007).
   New Delhi, (2007).
BPH101  ENGINEERING PHYSICS – I  L T P C
3 0 0 3

UNIT I  ULTRASONICS  9
Introduction – Production – magnetostriction effect – Magnetostriction generator – piezoelectric effect –
piezoelectric generator – Detection of ultrasonic waves – properties – Cavitations – Velocity measurement –
acoustic grating – Industrial applications – drilling, welding, soldering and cleaning –
SONAR – Non Destructive Testing – pulse echo system through transmission and reflection modes –
A,B and C – scan displays, Medical applications – Sonograms.

UNIT II  LASERS  9
Introduction – Principle of Spontaneous emission and stimulated emission, Population inversion,

UNIT III  FIBER OPTICS & APPLICATIONS  9
Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle -
Types of optical fibres (material, refractive index, mode) – Double crucible technique of fibre drawing –

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:
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**UNIT I  WATER TECHNOLOGY**


**UNIT II  POLYMERS AND COMPOSITES**


**UNIT III  SURFACE CHEMISTRY**


**UNIT IV  NON-CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES**


**UNIT V  ENGINEERING MATERIALS**


**TOTAL:** 45 PERIODS

**TEXT BOOKS:**


**REFERENCES:**

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
cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the
above curves.

FREE HAND SKETCHING:
Representation of Three Dimensional objects – General principles of orthographic projection – Need
for importance of multiple views and their placement – First angle projection – layout views –
Developing visualization skills through free hand sketching of multiple views from pictorial views of
objects.

UNIT II  PROJECTION OF POINTS, LINES AND PLANE SURFACES
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:
(2008).
BCS131       COMPUTER PRACTICE LABORATORY – I       L T P C
                          0 0 3 2

LIST OF EXERCISES
I. MS Office

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

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

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

TOTAL: 45 PERIODS

For programming exercises Flow chart and pseudocode are essential.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 60 STUDENTS

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

SOFTWARE
   • OS – Windows / UNIX Clone
   • Application Package – Office suite
   • Compiler – “C”
BPC131  PHYSICS AND CHEMISTRY LABORATORY – I  L T P C
0 0 3 2

PHYSICS LABORATORY – I

LIST OF EXPERIMENTS
1.   (a) Particle size determination using Diode Laser.
     (b) Determination of Laser parameters – Wavelength and angle of divergence.
     (c) Determination of acceptance angle in an optical fiber.
2.   Determination of thickness of a thin wire – Air wedge method.
6.   Determination of Hysteresis loss in a ferromagnetic material.

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
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

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
**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**

10


**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**

5

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

**Suggested Activities**

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

**TOTAL 45 periods**

**AREAS TO BE COVERED UNDER DIFFERENT HEADINGS**

**A. Language Focus**

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

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

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

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

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

TEXT BOOK:

REFERENCES:
Extensive Reading:


Note:
The book listed under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.
BMA201 MATHEMATICS – II
(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 parallelepeds.

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

UNIT IV COMPLEX INTEGRATION 12

UNIT V LAPLACE TRANSFORM 12

TOTAL: 60 PERIODS

TEXT BOOK:

REFERENCES:
UNIT I  CONDUCTING MATERIALS  

UNIT II  SEMICONDUCTING MATERIALS  

UNIT III  MAGNETIC AND SUPERCONDUCTING MATERIALS  

UNIT IV  DIELECTRIC MATERIALS  

UNIT V  MODERN ENGINEERING MATERIALS  

TOTAL: 45 PERIODS

TEXT BOOKS:
2. Charles P. Poole and Frank J.Ownen, ‘Introduction to Nanotechnology’, Wiley India (2007) (for Unit V)
REFERENCES:
BCY201       ENGINEERING CHEMISTRY – II                        L  T  P  C
(Common to all branches)                                    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                                  9

UNIT II   CORROSION AND CORROSION CONTROL                  9

UNIT III  FUELS AND COMBUSTION                             9

UNIT IV    PHASE RULE AND ALLOYS                           9

UNIT V    ANALYTICAL TECHNIQUES                            9
TEXT BOOKS:

REFERENCES:
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) 
L T P C 
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:
UNIT I  CIRCUIT ANALYSIS TECHNIQUES  12

UNIT II  TRANSIENT & RESONANCE IN RLC CIRCUITS  12

UNIT III  SEMICONDUCTOR DIODES  12

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

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

TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
(a) BEE202 BASIC ELECTRICAL & ELECTRONICS ENGINEERING L T P C
(For Mechanical & Civil Branches) 4 0 0 4

UNIT I ELECTRICAL CIRCUITS & MEASUREMENTS 12

UNIT II ELECTRICAL MACHINES 12

UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS 12

UNIT IV DIGITAL ELECTRONICS 12

UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING 12

TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:
UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS 15

UNIT II BUILDING COMPONENTS AND STRUCTURES 15

TOTAL: 30 PERIODS

UNIT III POWER PLANT ENGINEERING 10

UNIT IV IC ENGINES 10
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 10

TOTAL: 30 PERIODS

REFERENCES:
BCS231 COMPUTER PRACTICE LABORATORY – II
(Common to all branches)

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
(Common to all branches)

L T P C
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 (Fe³⁺ Vs K₂Cr₂O₇)
5. pH Titration (Acid & Base)
6. Determination of water of crystallization of a crystalline salt (CuSO₄)
7. Estimation of Ferric ion by spectrophotometry.

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

List of Exercises using software capable of Drafting and Modeling

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems
   (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general
   multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involute using 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)

L T P C

0 0 3 2

LIST OF EXPERIMENTS

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

TOTAL: 45 PERIODS
(c) BEC231 CIRCUITS AND DEVICES LABORATORY
(For ECE, CSE & IT branches)

- 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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEG231</td>
<td>ENGLISH LANGUAGE SKILL LABORATORY (Skill of Listening)</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

**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**

**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**

**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**

**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 (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
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 –biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity –threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts –endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds. Field study of simple ecosystems – pond, river, hill slopes, etc.

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

unit iii natural resources 10
Forest resources: Use and over-exploitation, deforestation, case studies – timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over – utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in
conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

UNIT V HUMAN POPULATION AND THE ENVIRONMENT

TOTAL: 45

TEXT BOOKS:

REFERENCES:
BCE302  APPLIED GEOLOGY  L T P C  3 0 0 3

OBJECTIVE

At the end of this course the student shall be able to understand about geological formations, classification and morphology of rocks, and the importance of the study of geology for civil engineers with regard to founding structures like dams, bridges, buildings, etc. The student shall also be able to appreciate the importance of geological formation in causing earthquakes and land slides.

UNIT I  GENERAL GEOLOGY  9

UNIT II  MINERALOGY  9
Elementary knowledge on symmetry elements of important crystallographic systems – physical properties of minerals – study of the following rock forming minerals – Quartz family. Feldspar family, Augite, Hornblende, Biotite, Muscovite, Calcite, Garnet – properties, behaviour and engineering significance of clay minerals – Fundamentals of process of formation of ore minerals – Coal and petroleum – Their origin and occurrence in India.

UNIT III  PETROLOGY  9
Classification of rocks – distinction between igneous, sedimentary and metamorphic rocks. Description occurrence, engineering properties and distribution of following rocks. Igneous rocks – Granite, Syenite, Diorite, Gabbro, Pegmatite, Dolerite and Basalt. Sedimentary rocks sandstone, Limestone, shale conglomerate and breccia. Metamorphic rocks. Quartzite, Marble, Slate, Phyllite, Gneiss and Schist.

UNIT IV  STRUCTURAL GEOLOGY AND GEOPHYSICAL METHOD  9

UNIT V  GEOLOGICAL INVESTIGATIONS IN CIVIL ENGINEERING  9

TOTAL: 45

TEXT BOOKS

REFERENCES
BCE303  MECHANICS OF SOLIDS  

OBJECTIVE
The subject of Mechanics of Solids cuts broadly across all branches of engineering profession. At the end of this course, the student will have knowledge about behaviour of members subjected to various type of forces. The subject can be mastered best by solving numerous problems.

UNIT I  STRESS STRAIN AND DEFORMATION OF SOLIDS, STATES OF STRESS  12

UNIT II  ANALYSIS OF PLANE TRUSS, THIN CYLINDERS / SHELLS  12

UNIT III  TRANSVERSE LOADING ON BEAMS  12

UNIT IV  DEFLECTION OF BEAMS AND SHEAR STRESSES  12

UNIT V  TORSION AND SPRINGS  12
Stresses and deformation in circular (solid and hollow shafts) – stepped shafts – shafts fixed at both ends – leaf springs – stresses in helical springs – deflection of springs.

Lectures: 45  Tutorials: 15  Total: 60

TEXT BOOKS

REFERENCES
BCE304  MECHANICS OF FLUIDS  L T P C
3 1 0 4

OBJECTIVE
The student is introduced to the definition and properties of fluid. Principles of fluid statics, kinematics and dynamics are dealt with subsequently. The applications of similitude and model study are covered subsequently. After undergoing this course, the student would have learnt fluid properties and application to real situations of fluid flow.

UNIT I  DEFINITIONS AND FLUID PROPERTIES
Definitions – Fluid and fluid mechanics – Dimensions and units – Fluid properties – Continuum concept of system and control volume

UNIT II  FLUID STATICS & KINEMATICS
Pascal’s Law and Hydrostatic equation – Forces on plane and curved surfaces – Buoyancy – Meta centre – Pressure measurement – Fluid mass under relative equilibrium Fluid Kinematics Stream, streak and path lines – Classification of flows – Continuity equation (one, two and three dimensional forms) – Stream and potential functions – flow nets – Velocity measurement (Pitot tube, current meter, Hot wire and hot film anemometer, float technique, Laser Doppler velocimetry)

UNIT III  FLUID DYNAMICS
Euler and Bernoulli’s equations – Application of Bernoulli’s equation – Discharge measurement – Laminar flows through pipes and between plates – Hagen Poiseuille equation – Turbulent flow – Darcy-Weisbach formula – Moody diagram – Momentum Principle

UNIT IV  BOUNDARY LAYER AND FLOW THROUGH PIPES
Definition of boundary layer – Thickness and classification – Displacement and momentum thickness – Development of laminar and turbulent flows in circular pipes – Major and minor losses of flow in pipes – Pipes in series and in parallel – Pipe network

UNIT V  SIMILITUDE AND MODEL STUDY
Dimensional Analysis – Rayleigh’s method, Buckingham’s Pi-theorem – Similitude and models – Scale effect and distorted models.

Lectures: 45 Tutorials: 15 Total: 60

TEXT BOOKS

REFERENCES
BCE305 CONSTRUCTION TECHNIQUES, EQUIPMENT AND PRACTICE  L T P C
4 0 0 4

OBJECTIVE
The main objective of this course is to make the student aware of the various construction techniques, practices and the equipment needed for different types of construction activities. At the end of this course the student shall have a reasonable knowledge about the various construction procedures for sub to super structure and also the equipment needed for construction of various types of structures from foundation to super structure.

UNIT I CONCRETE TECHNOLOGY 12

UNIT II CONSTRUCTION PRACTICES 13

UNIT III SUB STRUCTURE CONSTRUCTION 13
Techniques of Box jacking – Pipe Jacking -under water construction of diaphragm walls and basement-Tunneling techniques – Piling techniques - well and caisson - sinking cofferdam - cable anchoring and grouting-driving diaphragm walls, sheet piles - shoring for deep cutting - well points - Dewatering and stand by Plant equipment for underground open excavation.

UNIT IV SUPER STRUCTURE CONSTRUCTION 12
Launching girders, bridge decks, off shore platforms – special forms for shells - techniques for heavy decks – in-situ pre-stressing in high rise structures, Material handling - erecting light weight components on tall structures - Support structure for heavy Equipment and conveyors - Erection of articulated structures, braced domes and space decks.

UNIT V CONSTRUCTION EQUIPMENT 10
Selection of equipment for earth work - earth moving operations - types of earthwork equipment - tractors, motor graders, scrapers, front end waders, earth movers – Equipment for foundation and pile driving. Equipment for compaction, batching and mixing and concreting - Equipment for material handling and erection of structures - Equipment for dredging, trenching, tunneling.

TEXT BOOKS

Total: 60
REFERENCES
BCE306 SURVEYING - I L T P C 3 0 0 3

OBJECTIVE
At the end of the course the students will possess knowledge about Chain surveying, Compass surveying, Plane table surveying, Levelling, Theodolite surveying and Engineering surveys.

UNIT I INTRODUCTION AND CHAIN SURVEYING 8
Definition - Principles - Classification - Field and office work - Scales - Conventional signs - Survey instruments, their care and adjustment - Range and chaining - Reciprocal ranging - Setting perpendiculars - well - conditioned triangles - Traversing - Plotting - Enlarging and reducing figures.

UNIT II COMPASS SURVEYING AND PLANE TABLE SURVEYING 7

UNIT III LEVELLING AND APPLICATIONS 12
Level line - Horizontal line - Levels and Staves - Spirit level - Sensitiveness - Bench marks - Temporary and permanent adjustments - Fly and check levelling - Booking - Reduction - Curvature and refraction - Reciprocal levelling - Longitudinal and cross sections - Plotting - Calculation of areas and volumes - Contouring - Methods - Characteristics and uses of contours - Plotting - Earth work volume - Capacity of reservoirs.

UNIT IV THEODOLITE SURVEYING 8
Theodolite - Vernier and microptic - Description and uses - Temporary and permanent adjustments of vernier transit - Horizontal angles - Vertical angles - Heights and distances - Traversing - Closing error and distribution - Gale’s tables - Omitted measurements.

UNIT V ENGINEERING SURVEYS 10
Reconnaissance, preliminary and location surveys for engineering projects - Lay out – Setting out works - Route Surveys for highways, railways and waterways - Curve ranging – Horizontal and vertical curves - Simple curves - Setting with chain and tapes, tangential angles by theodolite, double theodolite - Compound and reverse curves - Transition curves – Functions and requirements - Setting out by offsets and angles - Vertical curves - Sight distances – Mine Surveying - instruments - Tunnels - Correlation of under ground and surface surveys - Shafts - Adits.

TOTAL: 45

TEXT BOOKS

REFERENCES
BCE331  SURVEY PRACTICAL – I  

**OBJECTIVE**

At the end of the course the student will possess knowledge about Survey field techniques

1. Study of chains and its accessories
2. Aligning, Ranging and Chaining
3. Chain Traversing
4. Compass Traversing
5. Plane table surveying: Radiation
6. Plane table surveying: Intersection
7. Plane table surveying: Traversing
8. Plane table surveying: Resection – Three point problem
9. Plane table surveying: Resection – Two point problem
10. Study of levels and levelling staff
11. Fly levelling using Dumpy level
12. Fly levelling using tilting level
13. Check levelling
14. LS and CS
15. Contouring
16. Study of Theodolite

**TOTAL: 60**

**SURVEY PRACTICAL I & SURVEY PRACTICAL II**

**LIST OF EQUIPMENTS**

(For a batch of 30 students)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Description of Equipments</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Total Station</td>
<td>3 Nos</td>
</tr>
<tr>
<td>2.</td>
<td>Theodolites</td>
<td>Atleast 1 for every 10 students</td>
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<tr>
<td>3.</td>
<td>Dumpy level</td>
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<tr>
<td>4.</td>
<td>Plane table</td>
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<tr>
<td>5.</td>
<td>Pocket Stereoscope</td>
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<tr>
<td>6.</td>
<td>Ranging rods</td>
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<tr>
<td>7.</td>
<td>Levelling staff</td>
<td></td>
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<tr>
<td>8.</td>
<td>Cross staff</td>
<td></td>
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<tr>
<td>9.</td>
<td>Chains</td>
<td></td>
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<tr>
<td>10.</td>
<td>Tapes</td>
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<td>11.</td>
<td>Arrows</td>
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</tr>
</tbody>
</table>

52
BCE332 COMPUTER AIDED BUILDING DRAWING L T P C
0 0 4 2

OBJECTIVE
At the end of this course the student should be able to draft on computer building drawings (Plan, elevation and sectional views) in accordance with development and control rules satisfying orientation and functional requirements for the following:

1. Buildings with load bearing walls (Flat and pitched roof) –
   Including details of doors and windows 15
2. RCC framed structures - 15
4. Perspective view of one and two storey buildings - 15

TOTAL: 60

TEXT BOOKS

REFERENCES

Examination Guideline
30% of the end semester examination paper shall deal with planning, while the rest 70% shall be based on the drafting skill.

LIST OF EQUIPMENTS
(For a batch of 30 students)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Description of Equipments</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Computer system of Pentium IV or equivalent</td>
<td>1 for each student</td>
</tr>
<tr>
<td>2.</td>
<td>Licensed version of any reputed Analysis, Design &amp; Drafting software</td>
<td>1 copy for a set of 3 students</td>
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</tbody>
</table>
BEG331 COMMUNICATION SKILLS AND TECHNICAL SEMINAR – I
(Common to all branches) 0 0 3 2
(To be conducted as a Practical Paper by the Depts of English for 3 hrs per week)

OBJECTIVES:
- 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)
- English phonemes with special emphasis on the diphthongs
- 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
BMA404  NUMERICAL METHODS  (Common to EEE & Civil)  L T P C
3 1 0 4

OBJECTIVES
At the end of the course, the students would be acquainted with the basic concepts in numerical methods and their uses are summarized as follows:

i. The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigen value problem of a matrix can be obtained numerically where analytical methods fail to give solution.

ii. When huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.

iii. The numerical differentiation and integration find application when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information.

iv. Since many physical laws are couched in terms of rate of change of one/two or more independent variables, most of the engineering problems are characterized in the form of either nonlinear ordinary differential equations or partial differential equations. The methods introduced in the solution of ordinary differential equations and partial differential equations will be useful in attempting any engineering problem.

UNIT I  SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS  9+3

UNIT II  INTERPOLATION AND APPROXIMATION  9+3
Lagrangian Polynomials – Divided differences – Interpolating with a cubic spline – Newton’s forward and backward difference formulas.

UNIT III  NUMERICAL DIFFERENTIATION AND INTEGRATION  9+3

UNIT IV  INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS  9+3

UNIT V  BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS  9+3
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.

LECTURES: 45 TUTORIALS: 15 TOTAL: 60

TEXT BOOKS
REFERENCES
New Delhi, 2003.
Delhi.
BCE401 APPLIED STRENGTH OF MATERIALS  
L T P C  
3 1 0 4  

OBJECTIVES  
This subject is useful for a detailed study of forces and their effects along with some suitable protective measures for the safe working condition. This knowledge is very essential for an engineer to enable him in designing all types of structures and machines.

UNIT I ENERGY PRINCIPLES  
Strain energy and strain energy density – strain energy in traction, shear in flexure and torsion – castigliano’s theorems – principle of virtual work – application of energy theorems for computing deflections in beams and trusses – Maxwell’s reciprocal theorems

UNIT II INDETERMINATE BEAMS  
Propped cantilever and fixed beams-fixed end moments and reactions for concentrated load (central, non central), uniformly distributed load, triangular load (maximum at centre and maximum at end) – theorem of three moments – analysis of continuous beams – shear force and bending moment diagrams for continuous beams – slope & deflections in continuous beams (qualitative study only)

UNIT III COLUMNS  
Eccentrically loaded short columns – middle third rule – core section – columns of unsymmetrical sections – (angle channel sections) – Euler’s theory of long columns – critical loads for prismatic columns with different end conditions; Rankine-Gordon formula for eccentrically loaded columns - thick cylinders – compound cylinders.

UNIT IV STATE OF STRESS IN THREE DIMENSIONS  

UNIT V ADVANCED TOPICS IN BENDING OF BEAMS  
Unsymmetrical bending of beams of symmetrical and unsymmetrical sections – curved beams – Winkler Bach formula – stress concentration – fatigue and fracture

Lectures: 45 Tutorials: 15 Total: 60

TEXT BOOKS  

REFERENCES  
BCE402  SOIL MECHANICS  L T P C  3 0 0 3

OBJECTIVE
After undergoing this course, the student gains adequate knowledge on engineering properties of soil.

UNIT I  INTRODUCTION  10

UNIT II  SOIL WATER AND WATER FLOW  8

UNIT III  STRESS DISTRIBUTION, COMPRESSIBILITY AND SETTLEMENT  10
Stress distribution in soil media – Boussinesq formula – stress due to line load and Circular and rectangular loaded area - approximate methods - Use of influence charts – Westergaard equation for point load - Components of settlement - Immediate and consolidation settlement - Terzaghi's one dimensional consolidation theory – governing differential equation – laboratory consolidation test – Field consolidation curve – NC and OC clays - problems on final and time rate of consolidation

UNIT IV  SHEAR STRENGTH  9
Shear strength of cohesive and cohesionless soils - Mohr - Coulomb failure theory – Saturated soil - Strength parameters - Measurement of shear strength, direct shear, Triaxial compression, UCC and Vane shear tests –Types of shear tests based on drainage and their applicability - Drained and undrained behaviour of clay and sand – Stress path for conventional triaxial test.

UNIT V  SLOPE STABILITY  8

Total: 45

TEXT BOOKS

REFERENCES
OBJECTIVE
Student is introduced to open channel flow characteristics including hydraulic jump and surges. Hydraulic machines viz flow through turbines and pumps including their performance characteristics and design aspects are taught. Student, at the end of the semester will have the abilities to analyse flow characteristics in open channel and design hydraulic machines.

UNIT I  OPEN CHANNEL FLOW  12
Open channel flow – Types and regimes of flow – Velocity distribution in open channel – Wide open channel – Specific energy – Critical flow and its computation – channel transition.

UNIT II  UNIFORM FLOW  11
Uniform flow – Velocity measurement – Manning’s and Chezy’s formula – Determination of roughness coefficients – Determination of normal depth and velocity – Most economical sections – Non-erodible channels

UNIT III  VARIED FLOW  12

UNIT IV  PUMPS  12
Centrifugal pump - minimum speed to start the pump – multistage Pumps – Jet and submersible pumps - Positive displacement pumps - reciprocating pump - negative slip - flow separation conditions - air vessels -indicator diagram and its variation - savings in work done – rotary pumps.

UNIT V  TURBINES  13
Turbines - draft tube and cavitations – Application of momentum principle – Impact of jets on plane and curved plates - turbines - classification - radial flow turbines - axial flow turbines – Impulse and Reaction

Lectures: 45 Tutorials: 15 Total: 60

TEXT BOOKS

REFERENCES
BCE404 SURVEYING – II

OBJECTIVE
At the end of the course the student will posses knowledge about Tachometric surveying, Control surveying, Survey adjustments, Astronomical surveying and Photogrametry.

UNIT I TACHEOMETRIC SURVEYING 6
Tacheometric systems - Tangential, stadia and subtense methods - Stadia systems – Horizontal and inclined sights - Vertical and normal staffing - Fixed and movable hairs - Stadia constants - Anallactic lens - Subtense bar.

UNIT II CONTROL SURVEYING 8
Working from whole to part - Horizontal and vertical control methods - Triangulation - Signals - Baseline - Instruments and accessories - Corrections - Satellite station - Reduction to centre - Trignometric levelling - Single and reciprocal observations - Modern trends – Bench marking

UNIT III SURVEY ADJUSTMENTS 8
Errors - Sources, precautions and corrections - Classification of errors - True and most probable values - weighted observations - Method of equal shifts - Principle of least squares – Normal equation - Correlates - Level nets - Adjustment of simple triangulation networks.

UNIT IV ASTRONOMICAL SURVEYING 11
Celestial sphere - Astronomical terms and definitions - Motion of sun and stars – Apparent altitude and corrections - Celestial co-ordinate systems - Different time systems - use of Nautical almanac - Star constellations - calculations for azimuth of a line.

UNIT V HYDROGRAPHIC AND ADVANCE SURVEYING 12

TOTAL: 45

TEXT BOOKS

REFERENCES
BCE405  HIGHWAY ENGINEERING          L T P C
                                              3 0 0 3

OBJECTIVE
The objective of the course is to educate the students on the various components of Highway Engineering. It exposes the students to highway planning, engineering surveys for highway alignment, Design of Geometric Elements of Highways and Urban roads, Rigid and Flexible pavements design. The students further learn the desirable properties of highway materials and various practices adopted for construction. This course enables the students to develop skill on evaluation of the pavements and to decide appropriate types of maintenance.

UNIT I  HIGHWAY PLANNING AND ALIGNMENT          9

UNIT II  GEOMETRIC DESIGN OF HIGHWAYS         9

UNIT III  FLEXIBLE AND RIGID PAVEMENTS          9

UNIT IV  HIGHWAY MATERIALS AND CONSTRUCTION PRACTICE        9

UNIT V  HIGHWAY MAINTENANCE           9

TOTAL: 45
TEXT BOOKS

REFERENCES
3. Bureau of Indian Standards (BIS) Publications on Highway Materials Specifications for Road and Bridges, NORTH (India).
BCE431  STRENGTH OF MATERIALS LABORATORY  

OBJECTIVE

The experimental work involved in this laboratory should make the student understand the fundamental modes of loading of the structures and also make measurements of loads, displacements and strains. Relating these quantities, the student should be able to obtain the strength of the material and stiffness properties of structural elements.

LIST OF EXPERIMENTS

1. Test involving axial compression to obtain the stress – strain curve
2. Test involving axial tension to obtain the stress – strain curve and the strength
3. Test involving torsion to obtain the torque vs. angle of twist and hence the stiffness
4. Test involving flexure to obtain the load deflection curve and hence the stiffness
5. Tests on springs
6. Hardness tests
7. Shear test
8. Test for impact resistance
9. Tests on Cement

The student should learn the use of deflectometer, extensometer, compressometer and strain gauges.

Total: 45

LIST OF EQUIPMENTS (For a batch of 30 students)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description of Equipments</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>UTM of minimum 400 KN capacity</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Torsion testing machine for steel rods</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Izod impact testing machine</td>
<td>1</td>
</tr>
</tbody>
</table>
| 4.      | Hardness testing machine  
  Rockwell  
  Vicker’s  
  Brinnel \{ (any 2) \} | 1 each |
| 5.      | Beam deflection test apparatus | 1        |
| 6.      | Extensometer | 1        |
| 7.      | Compressometer | 1        |
| 8.      | Dial gauges | Few |
| 9.      | Le Chatelier’s apparatus | 2        |
| 10.     | Vicat’s apparatus | 2        |
| 11.     | Mortar cube moulds | 10       |
BCE432  HYDRAULIC ENGINEERING LABORATORY  L T P C
0 0 3 2

OBJECTIVE
Student should be able to verify the principles studied in theory by conducting the experiments.

LIST OF EXPERIMENTS
1. Determination of co-efficient of discharge for orifice
2. Determination of co-efficient of discharge for notches
3. Determination of co-efficient of discharge for venturimeter
4. Determination of co-efficient of discharge for orifice meter
5. Study of impact of jet on flat plate (normal / inclined)
6. Study of friction losses in pipes
7. Study of minor losses in pipes
8. Study on performance characteristics of Pelton turbine.
9. Study on performance characteristics of Francis turbine
10. Study on performance characteristics of Kaplan turbine
11. Study on performance characteristics of Centrifugal pumps (Constant speed / variable speed)
12. Study on performance characteristics of reciprocating pump.

TOTAL: 45 PERIODS

LIST OF EQUIPMENTS
1. Bernoulli’s theorem – Verification Apparatus - 1 No.
2. Calculation of Metacentric height water tank  - 1 No.
   Ship model with accessories - 1 No.
3. Measurement of velocity
   Pitot tube assembly - 1 No.
4. Flow measurement
   Open channel flow
   (i) Channel with provision for fixing notches
       (Rectangular, triangular & trapezoidal forms) - 1 Unit
   (ii) Flume assembly with provisions for conducting experiments on Hydraulic jumps, generation of surges etc. - 1 Unit
5. Flow measurement in pipes
   (i) Venturimeter, U tube manometer fixtures like Valves, collecting tank - 1 Unit
   (ii) Orifice meter, with all necessary fittings in Pipe lines of different diameters - 1 Unit
   (iii) Calibration of flow through orifice tank with Provisions for fixing orifices of different shapes, collecting tank - 1 Unit
   (iv) Calibration of flow through mouth piece Tank with provisions for fixing mouth pieces Viz external mouth pieces & internal mouth piece Borda’s mouth piece - 1 Unit
6. Losses in Pipes
   Major loss – Friction loss
   Pipe lengths (min. 3m) of different diameters with
   Valves and pressure rapping & collecting tank  - 1 Unit
   Minor Losses
   Pipe line assembly with provisions for having
   Sudden contractions in diameter, expansions
   Bends, elbow fitting, etc.  - 1 Unit

7. Pumps
   (i) Centrifugal pump assembly with accessories
       (Single stage) - 1 Unit
   (ii) Centrifugal pump assembly with accessories
        (Multi stage) - 1 Unit
   (iii) Reciprocating pump assembly with accessories - 1 Unit
   (iv) Deep well pump assembly set with accessories - 1 Unit

8. Turbine
   (i) Impulse turbine assembly with fittings
       & accessories - 1 Unit
   (ii) Francis turbine assembly with fittings
        & accessories - 1 Unit
   (iii) Kaplan turbine assembly with fittings
        & accessories - 1 Unit
BCE433 SURVEY PRACTICAL – II

OBJECTIVE
At the end of the course the student will posses knowledge about Survey field techniques.

1. Study of theodolite
2. Measurement of horizontal angles by reiteration and repetition and vertical angles
3. Theodolite survey traverse
5. Tacheometry - Tangential system - Stadia system - Subtense system.
6. Setting out works - Foundation marking - Simple curve (right/left-handed) – Transition curve.
7. Field observation and Calculation of azimuth
8. Field work using Total Station.

TOTAL: 60 PERIODS
BEG431  COMMUNICATION SKILLS AND TECHNICAL SEMINAR – II  L T P C  0 0 3 2
(Common to all branches)
(To be conducted as a Practical Paper by the Depts of English for 3 hrs per week)

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

COURSE CONTENT:
A) Phonetic practice (7 hrs)
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 /ae/, /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
BCE501  IRRIGATION ENGINEERING  L T P C
3 0 0 3

OBJECTIVE

- The student shall understand the need and mode of irrigation. The student shall also know the irrigation management practices of the past, present and future. The structures involved the elementary hydraulic design of different structures and the concepts of maintenance shall also form part. Finally, the student shall be in a position to conceive and plan any type of irrigation project.

UNIT I  INTRODUCTION  8

UNIT II  IRRIGATION METHODS AND WATER MANAGEMENT  9

UNIT III  CANAL IRRIGATION  8
Alignment of canals – Classification of canals – Canal falls – Types – Design of vertical drop – Cross drainage works – Types – Canal Head works – Canal regulators – River Training works.

UNIT IV  WEIRS AND TANKS  10
Weirs and Barrage – Classification of weirs – Layout of a diversion head work – component parts – Failure of weirs founded on impervious foundation – Bligh’s creep theory – Khosla’s theory – Tanks – Isolated tanks and tanks in series – Tank weirs – Types of tank weirs – Tank sluices

UNIT V  DAMS  10

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVE

- The members of a structure are subjected to internal forces like axial forces, shear forces, bending and torsional moments while transferring the loads acting on it. Structural analysis deals with analysing these internal forces in the members of the structures.

UNIT I  
DEFLECTION OF DETERMINATE STRUCTURES  
Principles of virtual work for deflections – Deflections of pin-jointed plane frames and rigid plane frames – Willot diagram – Mohr’s correction

UNIT II  
MOVING LOADS AND INFLUENCE LINES  
(Determinate & Indeterminate Structures with Redundancy Restricted To One)  
Influence lines for reactions in statically determinate structures – influence lines for members forces in pin-jointed frames – Influence lines for shear force and bending moment in beam sections – Calculation of critical stress resultants due to concentrated and distributed moving loads. Muller Breslau’s principle – Influence lines for continuous beams and single storey rigid frames – Indirect model analysis for influence lines of indeterminate structures – Begg’s deformeter

UNIT III  
ARCHES  
Arches as structural forms – Examples of arch structures – Types of arches – Analysis of three hinged, two hinged and fixed arches, parabolic and circular arches – Settlement and temperature effects.

UNIT IV  
SLOPE DEFLECTION METHOD  
Continuous beams and rigid frames (with and without sway) – Symmetry and antisymmetry – Simplification for hinged end – Support displacements

UNIT V  
MOMENT DISTRIBUTION METHOD  
Distribution and carryover of moments – Stiffness and carry over factors – Analysis of continuous beams – Plane rigid frames with and without sway – Naylor’s simplification.

L:45 T:15, TOTAL: 60 PERIODS

TEXT BOOKS


REFERENCES

BCE503 DESIGN OF REINFORCED CONCRETE ELEMENTS L T P C
3 0 0 3

OBJECTIVE
• This course covers the different types of philosophies related to Design of Reinforced Concrete Structures with emphasis on Limit State Method. The design of Basic elements such as slab, beam, column and footing which form a part of any structural system with reference to Indian standard code of practice for Reinforced Concrete Structures and Design Aids are included. At the end of course the student shall be in a position to design the basic elements of reinforced concrete structures.

UNIT I METHODS OF DESIGN OF CONCRETE STRUCTURES 9

UNIT II LIMIT STATE DESIGN FOR FLEXURE 9
Analysis and design of one way and two way rectangular slab subjected to uniformly distributed load for various boundary conditions and corner effects – Analysis and design of singly and doubly reinforced rectangular and flanged beams

UNIT III LIMIT STATE DESIGN FOR BOND, ANCHORAGE SHEAR AND TORSION 9
Behaviour of RC members in bond and Anchorage - Design requirements as per current code - Behaviour of RC beams in shear and torsion - Design of RC members for combined bending shear and torsion.

UNIT IV LIMIT STATE DESIGN OF COLUMNS 9
Types of columns – Braced and unbraced columns – Design of short column for axial, uniaxial and biaxial bending – Design of long columns.

UNIT V LIMIT STATE DESIGN OF FOOTING AND DETAILING 9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE504  ENVIRONMENTAL ENGINEERING – I  L T P C  3 0 0 3

OBJECTIVE
• To make the students conversant with principles of water supply, treatment and distribution

UNIT I  PLANNING FOR WATER SUPPLY SYSTEM  9
Public water supply system -Planning -Objectives -Design period - Population forecasting -Water demand -Sources of water and their characteristics -Surface and Groundwater- Impounding Reservoir

UNIT II  CONVEYANCE SYSTEM  9
Water supply -intake structures -Functions and drawings -Pipes and conduits for water- Pipe materials
- Hydraulics of flow in pipes -Transmission main design -Laying, jointing and testing of pipes -
Drawings appurtenances - Types and capacity of pumps -Selection of pumps and pipe materials.

UNIT III  WATER TREATMENT  9
Objectives -Unit operations and processes -Principles, functions design and drawing of Flash mixers,
fiocculators, sedimentation tanks and sand filters -Disinfection- Residue Management.

UNIT IV  ADVANCED WATER TREATMENT  9
Aerator- Iron and manganese removal, Defluoridation and demineralization -Water softening -
Desalination -Membrane Systems -Construction and Operation & Maintenance aspects of Water
Treatment Plants -Recent advances -Membrane Processes

UNIT V  WATER DISTRIBUTION AND SUPPLY TO BUILDINGS  9
Requirements of water distribution - Components - Service reservoirs - Functions and drawings -
Network design - Economics - Computer applications - Analysis of distribution networks -
Appurtenances - operation and maintenance - Leak detection – Methods - Principles of design of
water supply in buildings - House service connection - Fixtures and fittings - Systems of plumbing
and drawings of types of plumbing.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
1. “Manual on Water Supply and Treatment”, CPHEEO, Ministry of Urban Development,
BCE505 FOUNDATION ENGINEERING L T P C 3 0 0 3

OBJECTIVE
- The student acquires the capacity to assess the soil condition at a given location in order to suggest suitable foundation and also gains the knowledge to design various foundations.

UNIT I SITE INVESTIGATION AND SELECTION OF FOUNDATION 9

UNIT II SHALLOW FOUNDATION 9

UNIT III FOOTINGS AND RAFTS 9
Types of foundation – Contact pressure distribution below footings and raft - Isolated and combined footings – Types and proportioning - Mat foundation– Types – applications - uses and proportioning - floating foundation.

UNIT IV PILES 9
Types of piles and their function – Factors influencing the selection of pile – Carrying capacity of single pile in granular and cohesive soil - Static formula - dynamic formulae (Engineering news and Hiley’s) – Capacity from insitu tests (SPT and SCPT) – Negative skin friction – uplift capacity – Group capacity by different methods (Feld’s rule, Converse Labarra formula and block failure criterion) – Settlement of pile groups – Interpretation of pile load test – Forces on pile caps – under reamed piles – Capacity under compression and uplift.

UNIT V RETAINING WALLS 9
Plastic equilibrium in soils – active and passive states – Rankine’s theory – cohesionless and cohesive soil – Coloumb’s wedge theory – condition for critical failure plane - Earth pressure on retaining walls of simple configurations – Graphical methods (Rebhann and Culmann) - pressure on the wall due to line load – Stability of retaining walls.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE506  CONCRETE TECHNOLOGY  

OBJECTIVE  
- The student should have learnt about various ingredients, properties and tests on fresh and hardened concrete that is commonly used in civil engineering constructions. Further student should be able to understand the various types of special concrete and their applications.

UNIT I  INGREDIENTS OF CONCRETE  9  

UNIT II  PROPERTIES OF CONCRETE  9  

UNIT III  CONCRETE MIX DESIGN AND QUALITY CONTROL OF CONCRETE  9  
Quality Control - Frequency of sampling – Statistical analysis of test results – standard deviation – Coefficient of variation – Characteristic strength –Acceptance and rejection Criteria – Importance of water cement ratio– Importance of cover to concrete – Nominal mixes – Design Mixes – factors influencing the design mix – Mix Design by ACI and IS method.

UNIT IV  DURABILITY AND CONCRETE UNDER SPECIAL CIRCUMSTANCES  9  

UNIT V  SPECIAL CONCRETES  9  

TOTAL: 45 PERIODS

TEXT BOOKS  

REFERENCES  
BCE531  CONCRETE AND HIGHWAY ENGINEERING LABORATORY  L T P C
0 0 3 2

OBJECTIVE
- To learn the principles and procedures of testing Concrete and Highway materials

I. TESTS ON FRESH CONCRETE
1. Slump cone test
2. Flow table
3. Compaction factor
4. Vee bee test.

II. TESTS ON HARDENED CONCRETE
1. Compressive strength - Cube & Cylinder
2. Flexure test
3. Modulus Of Elasticity

III. TESTS ON BITUMEN
1. Penetration
2. Softening Point
3. Ductility
4. Viscosity
5. Elastic Recovery
6. Storage Stability

IV. TESTS ON AGGREGATES
1. Soundness
2. Proportioning of Aggregates
3. Water Absorption

V. TESTS ON BITUMINOUS MIXES
1. Determination of Binder Content
3. Specific Gravity

TOTAL: 45 PERIODS
### EQUIPMENT REQUIRED FOR A BATCH OF 30 STUDENTS

<table>
<thead>
<tr>
<th>SL.NO</th>
<th>DESCRIPTION OF EQUIPMENTS</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Concrete cube moulds</td>
<td>6</td>
</tr>
<tr>
<td>2.</td>
<td>Concrete cylinder moulds</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>Concrete Prism moulds</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>Sieves</td>
<td>1 set</td>
</tr>
<tr>
<td>5.</td>
<td>Concrete Mixer</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>Slump cone</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>Flow table</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Vibrator</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>Trovels and planers</td>
<td>2 set</td>
</tr>
<tr>
<td>10.</td>
<td>Vee Bee Consistometer</td>
<td>1</td>
</tr>
<tr>
<td>11.</td>
<td>Aggregate impact testing machine</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td>Blains Apparatus</td>
<td>1</td>
</tr>
<tr>
<td>13.</td>
<td>Compression Testing Machine 200T capacity</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>Flexure Testing Machine</td>
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</tr>
<tr>
<td>15.</td>
<td>Compressometer</td>
<td>1</td>
</tr>
</tbody>
</table>
BCE532  SOIL MECHANICS LABORATORY   L T P C
                      0 0 3 2

OBJECTIVE

- The student acquires the capacity to test the soil to assess its Engineering and Index properties.

1. Grain size distribution - Sieve analysis
2. Grain size distribution - Hydrometer analysis
3. Specific gravity of soil grains
4. Relative density of sands
5. Atterberg limits test
7. Permeability determination (constant head and falling head methods)
8. Determination of shear strength parameters.
9. Direct shear test on cohesionless soil
10. Unconfined compression test on cohesive soil
11. Triaxial compression test (demonstration only)
12. One dimensional consolidation test (Demonstration only)
13. Field density test (Core cutter and sand replacement methods)

TOTAL: 45 PERIODS

LIST OF EQUIPMENT (For a batch of 30 students)

<table>
<thead>
<tr>
<th>SL.NO.</th>
<th>DESCRIPTION OF EQUIPMENTS</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sieves</td>
<td>2 sets</td>
</tr>
<tr>
<td>2.</td>
<td>Hydrometer</td>
<td>2 sets</td>
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<tr>
<td>3.</td>
<td>Liquid and plastic limit apparatus</td>
<td>2 sets</td>
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<tr>
<td>4.</td>
<td>Shrinkage limit apparatus</td>
<td>3 sets</td>
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<tr>
<td>5.</td>
<td>Proctor compaction apparatus</td>
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<tr>
<td>6.</td>
<td>CBR Apparatus</td>
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</tr>
<tr>
<td>7.</td>
<td>Direct shear apparatus</td>
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<tr>
<td>8.</td>
<td>Thermometer</td>
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<tr>
<td>9.</td>
<td>Field density measuring device</td>
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<tr>
<td>10.</td>
<td>Triaxial shear apparatus</td>
<td>1</td>
</tr>
<tr>
<td>11.</td>
<td>Three gang consolidation test device</td>
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</tr>
</tbody>
</table>
BCE533  IRRIGATION AND ENVIRONMENTAL ENGINEERING DRAWING  L T P C
1 0 3 2

OBJECTIVE
• To impart the basic knowledge on the components and special features of various irrigation and environmental structures.

IRRIGATION ENGINEERING
Design and drawing of
1. Tank Surplus Weir
2. Tank Sluice with a Tower Head
3. Canal Drop
4. Canal Regulators and river regulators.
5. Cross-Drainage Works (Syphon Aqueduct type II & III)

ENVIRONMENTAL ENGINEERING
Design and drawing of
1. Sedimentation tank
2. Clariflocculator
3. Slow sand filters
4. Rapid sand filters
5. Secondary settling tanks
6. Trickling filter
7. Softner
8. Activated sludge process
9. Sludge digestion tank
10. Septic tank with dispersion trench and soak pit.

TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
BGE501 PROFESSIONAL ETHICS AND HUMAN VALUES      L T P C
                                                3 0 0 3

OBJECTIVE
- To create awareness on Engineering Ethics and Human Values. Instill Moral and Social
  Values and Loyalty. To appreciate the rights of others

UNIT I HUMAN VALUES                        10
Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue Respect for
Commitment – Empathy – Self-Confidence – Character – Spirituality.

UNIT II ENGINEERING ETHICS                   9
Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral
autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of
Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical
theories.

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9
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     9
Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile
island and Chernobyl case studies. Collegiality and loyalty - respect for authority - collective
bargaining – confidentiality - conflicts of interest - occupational crime - professional rights -
employee rights - Intellectual Property Rights (IPR) - discrimination.

UNIT V GLOBAL ISSUES                        8
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
   1996.
   India, New Delhi, 2004.

REFERENCES
   Jersey, 2004 (Indian Reprint)
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, “Engineering Ethics –
   Concepts and Cases”, Wadsworth Thompson Learning, United States, 2000 (Indian Reprint
   now available).
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi,
   2003.
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and
<table>
<thead>
<tr>
<th>BCE601</th>
<th>DESIGN OF REINFORCED CONCRETE AND BRICK MASONRY STRUCTURES</th>
<th>L T P C</th>
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</tbody>
</table>

**OBJECTIVE**
- This course covers the design of Reinforced Concrete Structures such as Retaining Wall, Water Tanks, Staircases, Flat slabs and Principles of design pertaining to Box culverts, Mat foundation and Bridges. The student has a comprehensive design knowledge related to structures, systems that are likely to be encountered in professional practice.

**UNIT I  RETAINING WALLS**  
Retaining wall – Types – Design and detailing of cantilever and counter fort retaining walls

**UNIT II  WATER TANKS**  
Design – Underground rectangular tanks – Domes – Overhead circular and rectangular tanks – Design of staging and foundations

**UNIT III  SELECTED TOPICS**  

**UNIT IV  YIELD LINE THEORY**  
Application of virtual work method to square, rectangular, circular and triangular slabs

**UNIT V  BRICK MASONRY**  
Introduction, Classification of walls, Lateral supports and stability, effective height of wall and columns, effective length of walls, design loads, load dispersion, permissible stresses, design of axially and eccentrically loaded brick walls

**TOTAL: 45 PERIODS**

**TEXT BOOKS**

**REFERENCES**
BCE602  STRUCTURAL ANALYSIS – II  L T P C
3 1 0 4

OBJECTIVE
- To know the advanced method of analysis like Matrix method, Plastic Analysis and Space Structures.

UNIT I  FLEXIBILITY MATRIX METHOD  12
Equilibrium and compatibility – Determinate Vs Indeterminate structures – Indeterminacy - Primary structure – Compatibility conditions – Analysis of indeterminate pin-jointed plane frames, continuous beams, rigid jointed plane frames (with redundancy restricted to two).

UNIT II  STIFFNESS MATRIX METHOD  12
Element and global stiffness matrices – Analysis of continuous beams – Co-ordinate transformations – Rotation matrix – Transformations of stiffness matrices, load vectors and displacements vectors – Analysis of pin-jointed plane frames and rigid frames

UNIT III  FINITE ELEMENT METHOD  12

UNIT IV  PLASTIC ANALYSIS OF STRUCTURES  12

UNIT V  SPACE AND CABLE STRUCTURES  12
Analysis of Space trusses using method of tension coefficients – Beams curved in plan Suspension cables – suspension bridges with two and three hinged stiffening girders

L:45 T:15, TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
BCE603 DESIGN OF STEEL STRUCTURES L T P C
3 1 0 4

OBJECTIVE
- This course covers the design of structural steel members subjected to compressive, tensile and bending loads as per current codal provisions (IS 800 - 2007) including connections. Design of structural systems such as roof trusses, gantry girders is included.

UNIT I INTRODUCTION

UNIT II TENSION MEMBERS
Types of sections – Net area – Net effective sections for angles and Tee in tension – Design of connections in tension members – Use of lug angles – Design of tension splice – Concept of shear lag

UNIT III COMPRESSION MEMBERS
Types of compression members – Theory of columns – Basis of current codal provision for compression member design – Slenderness ratio – Design of single section and compound section compression members – Design of lacing and battening type columns – Design of column bases – Gusseted base

UNIT IV BEAMS
Types of simple beam connections – Design of laterally supported and unsupported beams – Built up beams – Beams subjected to biaxial bending – Design of plate girders riveted and welded – Intermediate and bearing stiffeners – Web splices

UNIT V ROOF TRUSSES AND INDUSTRIAL STRUCTURES
Roof trusses – Roof and side coverings – Design loads – design of purlin and elements of truss– end bearing – Design of gantry girder

L: 45 T:15, TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
BCE604  ENVIRONMENTAL ENGINEERING – II             L T P C
                                                3 0 0 3

OBJECTIVE
  • To educate the student on the principles and design of Sewage Collection, it’s Conveyance, treatment and disposal.

UNIT I  PLANNING FOR SEWERAGE SYSTEMS  9

UNIT II  SEWER DESIGN  9

UNIT III  PRIMARY TREATMENT OF SEWAGE  9
Objective – Unit Operation and Processes – Selection of treatment processes – Onsite sanitation - Septic tank, Grey water harvesting – Primary treatment – Principles, functions design and drawing of screen, grit chambers and primary sedimentation tanks – Operation and Maintenance aspects.

UNIT IV  SECONDARY TREATMENT OF SEWAGE  9

UNIT V  DISPOSAL OF SEWAGE AND SLUDGE  9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE631     ENVIRONMENTAL ENGINEERING LABORATORY     L T P C
                      0 0 3 2

OBJECTIVE

• This subject includes the list of experiments to be conducted for characterisation of water and municipal sewage. At the end of the course, the student is expected to be aware of the procedure for quantifying quality parameters for water and sewage.

LIST OF EXPERIMENTS

1. Sampling and preservation methods and significance of characterisation of water and wastewater.
2. Determination of
   i) pH and turbidity
   ii) Hardness
3. Determination of iron & fluoride
4. Determination of residual chlorine
5. Determination of Chlorides
6. Determination of Ammonia Nitrogen
7. Determination of Sulphate
8. Determination of lime dozing
9. Determination of Optimum Coagulant Dosage
10. Determination of available Chlorine in Bleaching powder
11. Determination of dissolved oxygen
12. Determination of suspended, volatile and fixed solids
13. B.O.D. test
14. C.O.D. test
15. Introduction to Bacteriological Analysis (Demonstration only)

TOTAL: 45 PERIODS

REFERENCES


LIST OF EQUIPMENTS (For a batch of 30 students)

1. pH meter - 1 No.
2. Turbidity meter - 1 No.
3. Conductivity meter - 1 No.
4. Refrigerator - 1 No.
5. BOD incubator - 1 No.
6. Muffle furnace - 1 No.
7. Hot air oven - 1 No.
8. Magnetic stirrer with hot plates - 5 Nos.
11. Water bath - 1 No.
12. Furniture - 1 lot
13. Glass waves / Crucibles - 1 lot
BCE632  COMPUTER AIDED DESIGN AND DRAFTING LABORATORY  L T P C
0 0 3 2

OBJECTIVE
- The student acquires hands on experience in design and preparation of structural drawings for concrete / steel structures normally encountered in Civil Engineering practice.

1. Design and detailing of Reinforced Cement Concrete cantilever and counter fort type retaining walls with reinforcement details
2. Design of solid slab and Reinforced Cement Concrete Tee beam bridges for Indian Road Congress loading and reinforcement details
3. Design and detailing of Intz type water tank, circular and rectangular water tanks

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES

LIST OF EQUIPMENTS
1. Models of Structures - 1 each.
2. Computers Pentium IV - 30 Nos.
3. Auto CAD Software
   - Multi user License - 1 No.
BCE633 SURVEY CAMP

Ten days survey camp using Theodolite, level, chains, cross staff, levelling staff, tapes and total station. The camp must involve work on a large area of not less than 400 hectares. The camp record shall include all original field observations, calculations and plots.

i) Triangulation
ii) Trilateration
iii) Contouring
iv) Fly and Check levelling
v) LS and CS
vi) Sun / Star observation to determine azimuth
vii) Use of GTS to determine latitude and longitude
viii) Surveying using Total Station

EVALUATION PROCEDURE

1. **Internal Marks** (decided by the staff in-charge appointed by the Institution) 40 marks
2. **Evaluation of Survey Camp Report** (Evaluated by the external examiner appointed by the COE with the approval of HOI) 20 marks
3. **Viva voce Examination** (evaluated by the internal examiner appointed by the HOD with the approval of HOI and external examiner appointed by the COE with the approval of HOI – with equal Weightage) 40 marks

**TOTAL 100 MARKS**
BCE701   STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING   L T P C
                     3 0 0 3

OBJECTIVE:
• The main objective of this course is to introduce the student about phenomena of earthquakes, the process, measurements and the factors that affect the design of structures in seismic areas. This objective is achieved through imparting rudiments of theory of vibrations necessary to understand and analyse the dynamic forces caused by earthquakes and structures. Further, the student is also taught the codal provisions as well as the Aseismic design methodology.

UNIT I    THEORY OF VIBRATIONS  9

UNIT II   MULTIPLE DEGREE OF FREEDOM SYSTEM  9
Two degree of freedom system – Normal modes of vibration – Natural frequencies - Mode shapes - Introduction to MDOF systems – Decoupling of equations of motion – Concept of mode superposition (No derivations).

UNIT III   ELEMENTS OF SEISMOLOGY  9

UNIT IV    RESPONSE OF STRUCTURES TO EARTHQUAKE  9

UNIT V    DESIGN METHODOLOGY  9
IS 1893, IS 13920 and IS 4326 – Codal provisions – Design as per the codes – Base isolation techniques – Vibration control measures – Important points in mitigating effects of earthquake on structures.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
3. NPEEE Publications.
BCE702  PRESTRESSED CONCRETE STRUCTURES     L T P C
                                      3 0 0 3

OBJECTIVE

- The student shall have knowledge of methods of prestressing, advantages of prestressing concrete, the losses involved and the design methods for prestressed concrete elements under codal provisions.

UNIT I      INTRODUCTION – THEORY AND BEHAVIOUR  9

UNIT II     DEFLECTION AND LOSSES           9
Effect of tendon profile on deflections – Factors influencing deflections – Calculation of deflections – Short term and long term deflections - Losses of prestress – Losses in pretensioned and post tensioned members – Estimation of crack width

UNIT III    DESIGN OF PRESTRESSED CONCRETE BEAMS  12

UNIT III    CIRCULAR PRESTRESSING           7
Design of prestressed concrete tanks – fixed & hinged base – Pipes

UNIT IV     COMPOSITE CONSTRUCTION           8
Analysis for stresses – Differential shrinkage – Deflections of composite members – Flexural strength of composite members

TOTAL: 45 PERIODS

TEXT BOOKS

3. Rajagopalan, N, “Prestressed Concrete”, Alpha Science, 2002

REFERENCES

1. Ramaswamy G.S., Modern prestressed concrete design, Arnold Heinimen, New Delhi, 1990
BCE703  ESTIMATION AND QUANTITY SURVEYING  L T P C  3 0 0 3

**OBJECTIVE**
- To know the various aspects of estimating of quantities of items of works involved in buildings, water supply and sanitary works, road works and irrigation works. This subject covers the rate analysis, valuation of properties and preparation of reports for estimation of various items. At the end of this course the student shall be able to estimate the material quantities, prepare a bill of quantities, make specifications and prepare tender documents. Student should also be able to prepare value estimates.

**UNIT I  ESTIMATE OF BUILDINGS**  11
Load bearing and framed structures – Calculation of quantities of brick work, RCC, PCC. Plastering, white washing, colour washing and painting / varnishing for shops, rooms, residential building with flat and pitched roof – Various types of arches – Calculation of brick work and RCC works in arches – Estimate of joineries for panelled and glazed doors, windows, ventilators, handrails etc.

**UNIT II  ESTIMATE OF OTHER STRUCTURES**  10

**UNIT III  SPECIFICATION AND TENDERS**  8

**UNIT IV  VALUATION**  8

**UNIT V  REPORT PREPARATION**  8

**TOTAL: 45 PERIODS**

**TEXT BOOKS**

**REFERENCES**
1. PWD Data Book.
BCE704 RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING L T P C
3 0 0 3

OBJECTIVE
• This course imparts the knowledge of planning, design, construction and maintenance of
railway tracks. The student develops skills on airport planning and design with the prime
focus on runway and taxiway geometrics. Students become conversant with the definition,
purpose, location and materials of coastal structures such as piers, breakwaters, wharves,
jetties, quays and spring fenders. The students acquire knowledge on site reconnaissance for
location and planning of harbours.

UNIT I RAILWAY PLANNING AND DESIGN 10
Role of Indian Railways in National Development – Railways for Urban Transportation – LRT &
MRTS - Engineering Surveys for Track Alignment – Obligatory points - Conventional and Modern
methods (Remote Sensing, GIS & GPS, EDM and other equipments) - Permanent Way, its
Components and their Functions: Rails - Types of Rails, Rail Fastenings, Concept of Gauges, Coning
of Wheels, Creeps and kinks -Sleepers – Functions, Materials, Density – Functions, Materials,
Ballastless Tracks - Geometric Design of Railway Tracks – Gradients and Grade Compensation,
Super-Elevation, Widening of Gauges in Curves, Transition Curves, Horizontal and Vertical Curves.

UNIT II RAILWAY TRACK CONSTRUCTION, MAINTENANCE AND OPERATION 8
Points and Crossings - Design of Turnouts, Working Principle - Signalling, Interlocking and Track
Circuiting - Construction & Maintenance – Conventional, Modern methods and Materials, Track
Drainage - Track Modernisation– Automated maintenance and upgrading, Re-laying of Track, Lay
outs of Railway Stations and Yards, Rolling Stock, Tractive Power, Track Resistance, Level
Crossings.

UNIT III AIRPORT PLANNING AND DESIGN 10
Role of Air Transport, Components of Airports - Airport Planning – Air traffic potential, Site
Selection, Design of Components, Cost Estimates, Evaluation and Institutional arrangements Runway
Design- Orientation, Cross wind Component, Wind rose Diagram (Problems), Geometric Design and
Corrections for Gradients (Problems), Drainage - Taxiway Design – Geometric Design Elements,
Minimum Separation Distances, Design Speed, Airport Drainage - Airport Zoning - Clear Zone,
Approach Zone, Buffer Zone, Turning Zone, Clearance over Highways and Railways

UNIT IV AIRPORT LAYOUTS, VISUAL AIDS, AND AIR TRAFFIC CONTROL 7
Airport Layouts – Apron, Terminal Building, Hangars, Motor Vehicle Parking Area and Circulation
Pattern, Case studies of Airport Layouts - Airport Buildings – Primary functions, Planning Concept,
Principles of Passenger Flow, Passenger Facilities - Visual Aids – Runway and Taxiway Markings,
Wind Direction Indicators, Runway and Taxiway Lightings - Air Traffic Control – Basic Actions, Air
Traffic Control Network - Helipads, Hangars, Service Equipments.

UNIT V HARBOUR ENGINEERING 10
Definition of Terms - Harbours, Ports, Docks, Tides and Waves, Littoral Drift, Sounding, Area,
Depth, Satellite Ports - Requirements and Classification of Harbours - Site Selection and Selection
Investigation – Speed of water, Dredging, Range of Tides, Waves and Tidal Currents, Littoral
Transport with Erosion and Deposition, Soundings, Anchoring Grounds, Geological Characteristics,
Winds & Storms, Position and Size of Shoals - Shore Considerations-Proximity to Towns/Cities,
Utilities, Construction Materials, Coast Lines - Dry and Wet Docks, Planning and Layouts - Entrance,
Position of Light Houses, Navigating - Terminal Facilities – Port Buildings, Warehouse, Transit
Sheds, Inter-modal Transfer Facilities, Mooring Accessories, Navigational Aids - Coastal Structures-
Piers, Breakwaters, Wharves, Jetties, Quays, Spring Fenders - Coastal Shipping, Inland Water
Transport and Container Transportation.
TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BMG601 PRINCIPLES OF MANAGEMENT 3 0 0 3

OBJECTIVES

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

UNIT I FOUNDATIONS


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

OBJECTIVE

- To develop the ability to design steel and concrete structural components and transfer the design into drawings as per Indian Standard Codes using commercially available software

DEVELOPMENT AND IMPLEMENTATION OF PROGRAM USING SOFTWARE

1. Analysis & Design of 2D & 3D Truss
2. Analysis & Design of 2D & 3D Frames
3. Design and detailing of trusses & frames (2D & 3D)
4. Structural design of Steel Gable Frames
5. Analysis and Design of simple two storey buildings

TOTAL: 60 PERIODS

REFERENCES / MANUALS / SOFTWARE

OBJECTIVE

- This course is to impart and improve the design capability of the student. This course conceives purely a design problem in any one of the disciplines of Civil Engineering; e.g., Design of an RC structure, Design of a waste water treatment plant, Design of a foundation system, Design of traffic intersection etc. The design problem can be allotted to either an individual student or a group of students comprising of not more than four. At the end of the course the group should submit a complete report on the design problem consisting of the data given, the design calculations, references, specifications if any and complete set of drawings which follow the design. In building design, the results of Manual design should be compared with design results obtained by using soft wares like STAAD PRO, STRAP etc.

TOTAL: 60 PERIODS

EVALUATION PROCEDURE

<table>
<thead>
<tr>
<th></th>
<th>Internal Marks (decided by the staff in-charge appointed by the Institution)</th>
<th>40 marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Evaluation of Project Report (Evaluated by the external examiner appointed by the COE with the approval of HOI)</td>
<td>20 marks</td>
</tr>
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<td>2.</td>
<td>Viva voce Examination (evaluated by the internal examiner appointed by the HOD with the approval of HOI and external examiner appointed by the COE with the approval of HOI – with equal Weightage)</td>
<td>40 marks</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>TOTAL 100 MARKS</td>
</tr>
</tbody>
</table>
BCE733  COMPREHENSION  L T P C  0 0 3 1

OBJECTIVE

- The objective of this course is to make the student comprehend through a series of lectures, the knowledge pool he/she has gone through seven semesters. This should form a basis on which the student shall be able to perform better in competitive examinations and interviews.

TOTAL: 45 PERIODS
BCE801 CONSTRUCTION PLANNING AND SCHEDULING L T P C
3 0 0 3

OBJECTIVE
• The student is expected to learn how to plan construction projects, schedule the activities using network diagrams, determine the cost of the project, control the cost of the project by creating cash flows and budgeting and how to use the project information as an information and decision making tool

UNIT I CONSTRUCTION PLANNING 8

UNIT II SCHEDULING PROCEDURES AND TECHNIQUES 12
Relevance of construction schedules-Bar charts-The critical path method-Calculations for critical path scheduling-Activity float and schedules-Presenting project schedules-Critical path scheduling for Activity-on-node and with leads, Lags and Windows-Calculations for scheduling with leads, lags and windows-Resource oriented scheduling-Scheduling with resource constraints and precedences-Use of Advanced Scheduling Techniques-Scheduling with uncertain durations-Crashing and time/cost trade offs-Improving the Scheduling process-Introduction to application software.

UNIT III COST CONTROL MONITORING AND ACCOUNTING 9
The cost control problem-The project Budget-Forecasting for Activity cost control - financial accounting systems and cost accounts-Control of project cash flows-Schedule control-Schedule and Budget updates-Relating cost and schedule information.

UNIT IV QUALITY CONTROL AND SAFETY DURING CONSTRUCTION 8

UNIT V ORGANIZATION AND USE OF PROJECT INFORMATION 8
Types of project information-Accuracy and Use of Information-Computerized organization and use of Information -Organizing information in databases-relational model of Data bases-Other conceptual Models of Databases-Centralized database Management systems-Databases and application programs-Information transfer and Flow.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVE

- The project work is to enable the students to work in convenient groups of not more than four members in a group on a project involving theoretical and experimental studies related to Civil Engineering. Every Project Work shall have a Guide who is a member of the faculty of Civil Engineering of the college where the student is registered. The hours allotted for this course shall be utilized by the students to receive directions from the Guide, on library reading, laboratory work, computer analysis or field work and also to present in periodical seminars the progress made in the project.

Each student shall finally produce a comprehensive report covering background information, literature Survey, problem statement, Project work details and conclusions.

This experience of project work shall help the student in expanding his / her knowledge base and also provide opportunity to utilise the creative ability and inference capability.

TOTAL: 180 PERIODS
OBJECTIVE

- To understand all the components of the hydrological cycle. The mechanics of rainfall, its spatial and temporal measurement and their applications will be understood. Simple statistical analysis and application of probability distribution of rainfall and runoff shall also be understood.

UNIT I PRECIPITATION

UNIT II ABSTRACTION FROM PRECIPITATION

UNIT III HYDROGRAPHS
Factors affecting Hydrograph – Base flow separation – Unit hydrograph – Derivation of unit hydrograph – S curve hydrograph – Unit hydrograph of different deviations – Synthetic Unit Hydrograph

UNIT IV FLOODS AND FLOOD ROUTING
Flood frequency studies – Recurrence interval – Gumbel’s method – Flood routing – Reservoir flood routing – Muskingum’s Channel Routing – Flood control

UNIT V GROUND WATER HYDROLOGY

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE002  REMOTE SENSING TECHNIQUES AND GEOGRAPHIC INFORMATION SYSTEM  

OBJECTIVE

- To introduce the student to the basic concepts and principles of various components of remote sensing. To provide an exposure to GIS and its practical applications in civil engineering.

UNIT I  EMR AND ITS INTERACTION WITH ATMOSPHERE 9
Definition of remote sensing and its components – Electromagnetic spectrum – wavelength regions important to remote sensing – Wave theory, Particle theory, Stefan-Boltzman and Wein’s Displacement Law – Atmospheric scattering, absorption – Atmospheric windows – spectral signature concepts – typical spectral reflective characteristics of water, vegetation and soil.

UNIT II  PLATFORMS AND SENSORS 9
Types of platforms – orbit types, Sun-synchronous and Geosynchronous – Passive and Active sensors – resolution concept – Pay load description of important Earth Resources and Meteorological satellites – Airborne and space borne TIR and microwave sensors.

UNIT III  IMAGE INTERPRETATION AND ANALYSIS 9

UNIT IV  GEOGRAPHIC INFORMATION SYSTEM 9

UNIT V  DATA ENTRY, STORAGE AND ANALYSIS 9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE003  PAVEMENT ENGINEERING  L T P C
3 0 0 3

OBJECTIVE
• To know the various IRC guidelines for designing flexible and rigid pavements and to assess quality and serviceability conditions of roads.

UNIT I   TYPE OF PAVEMENT AND STRESS DISTRIBUTION  9
Introduction - Pavement as layered structure - Pavement types - flexible and rigid - Stress and deflections in pavements under repeated loading

UNIT II   DESIGN OF FLEXIBLE PAVEMENTS   9
Flexible pavement design - Empirical—Semi empirical and theoretical Methods –Design procedure as per latest IRC guidelines - Design and specification of rural road

UNIT III DESIGN OF RIGID PAVEMENTS  9
Cement concrete pavements - Modified Westergard approach - Design procedure as per latest IRC guidelines - Joints in rigid pavements - Concrete roads and their scope in India.

UNIT IV   PERFORMANCE EVALUATION AND MAINTENANCE  9
Pavement Evaluation [Condition and evaluation surveys (Surface Appearance, Cracks, Patches And Pot Holes, Undulations, Ravelling, Roughness, Skid Resistance), Structural Evaluation By Deflection Measurements, Present Serviceability Index] Pavement maintenance. [IRC Recommendations Only]

UNIT V   STABILISATION OF PAVEMENTS  9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE004  HOUSING PLANNING AND MANAGEMENT  L T P C
                                               3 0 0 3

OBJECTIVE
- The objective of the course is to train the students to have a comprehensive knowledge of planning, design, evaluation, construction and financing of housing projects. The course focuses on cost effective construction materials and methods. Emphasis has also been given on the principles of sustainable housing policies and programmes.

UNIT I  INTRODUCTION TO HOUSING  9
Definition of Basic Terms – House, Home, Household, Apartments, Multi storeyed Buildings, Special Buildings, Objectives and Strategies of National Housing Policies, Principle of Sustainable Housing, Housing Laws at State level, Bye-laws at Urban and Rural Local Bodies – levels - Development Control Regulations, Institutions for Housing at National, State and Local levels

UNIT II  HOUSING PROGRAMMES  9
Basic Concepts, Contents and Standards for Housing Programmes - Sites and Services, Neighborhoods, Open Development Plots, Apartments, Rental Housing, Co-operative Housing, Slum Housing Programmes, Role of Public, Private and Non-Government Organizations

UNIT III  PLANNING AND DESIGN OF HOUSING PROJECTS  9
Formulation of Housing Projects – Site Analysis, Layout Design, Design of Housing Units (Design Problems)

UNIT IV  CONSTRUCTION TECHNIQUES AND COST-EFFECTIVE MATERIALS  9
New Constructions Techniques – Cost Effective Modern Construction Materials, Building Centers – Concept, Functions and Performance Evaluation

UNIT V  HOUSING FINANCE AND PROJECT APPRAISAL  9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
2. UNCHS, National Experiences with Shelter Delivery for the Poorest Groups, UNCHS (Habitat), Nairobi, 1994.
BCE005   GROUND WATER ENGINEERING   L T P C
         3 0 0 3

OBJECTIVE

• To understand the distribution of ground water, evaluation of aquifer parameters, solving
ground water equations. Ground water quality and development of ground water methods are
dealt.

UNIT I     FUNDAMENTALS OF GROUND WATER   9
Introduction – Characteristic of Ground water – Distribution of water - ground water column –
Permeability - Darcy's Law - Types of aquifers - Hydro geological Cycle – water level fluctuations.

UNIT II    HYDRAULICS OF FLOW   9
Storage coefficient - Specific field - Heterogeneity and Anisotropy - Transmissivity - Governing
equations of ground water flow - Steady state flow - Dupuit Forchheimer assumptions - Velocity
potential - Flow nets

UNIT III   ESTIMATION OF PARAMETERS   9
Transmissivity and Storativity – Pumping test - Unsteady state flow - Thiess method - Jacob method -
Image well theory – Effect of partial penetrations of wells - Collectors wells.

UNIT IV    GROUND WATER DEVELOPMENT   9
Infiltration gallery - Conjunctive use - Artificial recharge Rainwater harvesting - Safe yield - Yield
test – Geophysical methods – Selection of pumps.

UNIT V     WATER QUALITY   9
Ground water chemistry - Origin, movement and quality - Water quality standards - Saltwater
intrusion – Environmental concern

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCE
BCE006 MANAGEMENT OF IRRIGATION SYSTEMS

OBJECTIVE
- To know concept of irrigation water management practices of the past, present and future.

UNIT I IRRIGATION SYSTEM REQUIREMENTS

UNIT II IRRIGATION SCHEDULING

UNIT III MANAGEMENT
Structural and non-structural strategies in water use and management – Conjunctive use of surface and ground waters – Quality of irrigation water.

UNIT IV OPERATION
Operational plans – Main canals, laterals and field channels – Water control and regulating structures – Performance indicators – Case study

UNIT V INVOLVEMENT OF STAKE HOLDERS
Farmer’s participation in System operation – Water users associations – Farmer councils – Changing paradigms on irrigation management – Participatory irrigation management

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVE
• The student shall be able to understand the coastal processes, coastal dynamics, impacts of structures like docks, harbours and quays leading to simple management perspectives along the coastal zone.

UNIT I  COASTAL ZONE  9
Coastal zone – Coastal zone regulations – Beach profile – Surf zone – Off shore – Coastal waters – Estuaries – Wet lands and Lagoons – Living resources – Non living resources.

UNIT II  WAVE DYNAMICS  10

UNIT III  WAVE FORECASTING AND TIDES  9

UNIT IV  COASTAL PROCESSES  8
Erosion and depositional shore features – Methods of protection – Littoral currents – Coastal aquifers – Sea water intrusion – Impact of sewage disposal in seas.

UNIT V  HARBOURS  9
Structures near coast – Selection of site – Types and selection of break waters – Need and mode of dredging – Selection of dredgers – Effect of Mangalore forest.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE008  WATER RESOURCES ENGINEERING  L T P C  3 0 0 3

OBJECTIVE

- To know the different phases in Water Resources viz planning, collection of relevant data on water resources and also on National Water Policy. Reservoir planning, management and economic analysis aspects are covered in detail.

UNIT I  GENERAL

Water resources survey – Water resources of India and Tamilnadu – Description of water resources planning – Economics of water resources planning, physical and socio economic data – National Water Policy – Collection of meteorological and hydrological data for water resources development.

UNIT II  NETWORK DESIGN

Hydrologic measurements – Analysis of hydrologic data – Hydrologic station network – Station network design – Statistical techniques in network design.

UNIT III  WATER RESOURCE NEEDS

Consumptive and non-consumptive water use - Estimation of water requirements for irrigation, for drinking and navigation - Water characteristics and quality – Scope and aims of master plan - Concept of basin as a unit for development - Water budget and development plan.

UNIT IV  RESERVOIR PLANNING AND MANAGEMENT

Reservoir - Single and multipurpose – Multi objective - Fixation of Storage capacity - Strategies for reservoir operation - Sedimentation of reservoirs - Design flood-levees and flood walls - Channel improvement.

UNIT V  ECONOMIC ANALYSIS


TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

BCE009  GROUND IMPROVEMENT TECHNIQUES  L T P C  3 0 0 3

OBJECTIVE
- This course provides the knowledge on basic deficiencies of various soil deposits and implementing techniques of improvement.

UNIT I  INTRODUCTION  9
Role of ground improvement in foundation engineering - methods of ground improvement – Geotechnical problems in alluvial, laterite and black cotton soils -Selection of suitable ground improvement techniques based on soil condition.

UNIT II  DRAINAGE AND DEWATERING  9
Drainage techniques - Well points - Vacuum and electro osmotic methods - Seepage analysis for two dimensional flow-fully and partially penetrating slots in homogenous deposits (Simple cases only).

UNIT III  INSITU TREATMENT OF COHESIONLESS AND COHESIVE SOILS  9
Insitu densification of cohesionless and consolidation of cohesive soils -Dynamic compaction and consolidation - Vibrofloation - Sand pile compaction - Preloading with sand drains and fabric drains – Stone columns – Lime piles - Installation techniques only - relative merits of various methods and their limitations.

UNIT IV  EARTH REINFORCEMENT  9
Concept of reinforcement - Types of reinforcement material - Applications of reinforced earth – use of Geotextiles for filtration, drainage and separation in road and other works

UNIT V  GROUT TECHNIQUES  9
Types of grouts - Grouting equipment and machinery - Injection methods - Grout monitoring – Stabilisation with cement, lime and chemicals - Stabilisation of expansive soils.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE010 CONTRACT LAWS AND REGULATIONS

OBJECTIVE
- To know about the contract laws, tenders and legal requirements of construction.

UNIT I CONSTRUCTION CONTRACTS

UNIT II TENDERS

UNIT III ARBITRATION

UNIT IV LEGAL REQUIREMENTS

UNIT V LABOUR REGULATIONS

TOTAL: 45 PERIODS

TEXT BOOKS
2. Tamilnadu PWD Code, 1986

REFERENCES
BCE011  ENVIRONMENTAL IMPACT ASSESSMENT  L T P C  3 0 0 3

OBJECTIVE

- This subject deals with the various impacts of infrastructure projects on the components of environment and method of assessing the impact and mitigating the same. The student is expected to know about the various impacts of development projects on environment and the mitigating measures.

UNIT I  INTRODUCTION  8
Impact of development projects under Civil Engineering on environment - Environmental Impact Assessment (EIA) - Environmental Impact Statement (EIS) – EIA capability and limitations – Legal provisions on EIA

UNIT II  METHODOLOGIES  9
Methods of EIA – Check lists – Matrices – Networks – Cost-benefit analysis – Analysis of alternatives

UNIT III  PREDICTION AND ASSESSMENT  9
Assessment of Impact on land, water and air, noise, social, cultural flora and fauna; Mathematical models; public participation – Rapid EIA

UNIT IV  ENVIRONMENTAL MANAGEMENT PLAN  9
Plan for mitigation of adverse impact on environment – options for mitigation of impact on water, air and land, flora and fauna; Addressing the issues related to the Project Affected People – ISO 14000

UNIT V  CASE STUDIES  10

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE012 INTRODUCTION TO SOIL DYNAMICS AND MACHINE FOUNDATIONS

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**OBJECTIVE**
- This course deals with dynamic properties of soil and various design parameters required for the design of machine foundation as well as design of foundation for various reciprocating machines.

**UNIT I INTRODUCTION**
Vibration of elementary systems-vibratory motion-single degree freedom system-free and forced vibration with and without damping

**UNIT II WAVES AND WAVE PROPAGATION**
Wave propagation in an elastic homogeneous isotropic medium- Raleigh, shear and compression waves-waves in elastic half space

**UNIT III DYNAMIC PROPERTIES OF SOILS**
Elastic properties of soils-coefficient of elastic, uniform and non-uniform compression - shear-effect of vibration dissipative properties of soils-determination of dynamic properties of soil-codal provisions

**UNIT IV DESIGN PROCEDURES**
Design criteria - dynamic loads - simple design procedures for foundations under reciprocating machines - machines producing impact loads - rotary type machines

**UNIT V VIBRATION ISOLATION**
Vibration isolation technique - mechanical isolation - foundation isolation - isolation by location - isolation by barriers - active passive isolation tests.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**
1. S.Prakesh & V.K Puri, Foundation for machines, McGraw-Hill 1993

**REFERENCES**
BCE013      INDUSTRIAL WASTE MANAGEMENT       L T P C
                        3  0  0  3

OBJECTIVE
- This course deals with the pollution from major industries and methods of controlling the same. To know about the polluting potential of major industries in the country and the methods of controlling the same.

UNIT I  INTRODUCTION
8
Types of industries and industrial pollution – Characteristics of industrial wastes – Population equivalent – Bioassay studies – effects of industrial effluents on streams, sewer, land, sewage treatment plants and human health – Environmental legislations related to prevention and control of industrial effluents and hazardous wastes

UNIT II  CLEANER PRODUCTION
8

UNIT III  POLLUTION FROM MAJOR INDUSTRIES
9
Sources, Characteristics, waste treatment flow sheets for selected industries such as Textiles, Tanneries, Pharmaceuticals, Electroplating industries, Dairy, Sugar, Pulp & Paper, distilleries, Steel plants, Refineries, fertilizer, thermal power plants – Wastewater reclamation concepts

UNIT IV  TREATMENT TECHNOLOGIES
11

UNIT V  HAZARDOUS WASTE MANAGEMENT
9
Hazardous wastes - Physico chemical treatment – solidification – incineration – Secure land fills

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVE

- This course provides the basic knowledge of finite element method and shall be able to analyse linear elastic structures, which he has studied about in core courses, using finite element method.

UNIT I INTRODUCTION – VARIATIONAL FORMULATION 9

UNIT II FINITE ELEMENT ANALYSIS OF ONE DIMENSIONAL PROBLEMS 10

UNIT III FINITE ELEMENT ANALYSIS OF TWO DIMENSIONAL PROBLEMS 10

UNIT IV ISOPARAMETRIC ELEMENTS AND FORMULATION 8
Natural coordinates in 1, 2 and 3 dimensions – use of area coordinates for triangular elements in 2 dimensional problems – Isoparametric elements in 1,2 and 3 dimensional Largrangean and serendipity elements – Formulations of elements equations in one and two dimensions - Numerical integration.

UNIT V APPLICATIONS TO FIELD PROBLEMS IN TWO DIMENSIONS 8

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
BCE015 ECOLOGICAL ENGINEERING L T P C
3 0 0 3

OBJECTIVE

- This subject deals with the scope and applications of ecological effects for wastewater treatment and reuse. To know the various effects of industrialization on ecology and ecological based waste purification methods.

UNIT I PRINCIPLES AND CONCEPTS 9
Scope and applications of Ecological Engineering – Development and evolution of ecosystems – principles and concepts pertaining to species, populations and community

UNIT II ECOSYSTEM FUNCTIONS 10
Energy flow and nutrient cycling – Food chain and food webs – biological magnification, diversity and stability, immature and mature systems. Primary productivity – Biochemical cycling of nitrogen, phosphorous, sulphur and carbon dioxide – Habitat ecology - Terrestrial, fresh water, estuarine and marine habitats.

UNIT III ECOLOGICAL ENGINEERING METHODS 9
Bio monitoring and its role in evaluation of aquatic ecosystem; Rehabilitation of ecosystems through ecological principles – step cropping, bio-wind screens, Wetlands, ponds, Root Zone Treatment for wastewater, Reuse of treated wastewater through ecological systems.

UNIT IV ECOLOGICAL EFFECTS OF INDUSTRIALISATION 9
Ecological effects of exploration, production, extraction, processing, manufacture & transport.

UNIT V CASE STUDIES 8
Case studies of integrated ecological engineering systems

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVE

- This course shall be able to choose appropriate bridge structures and design it for given site conditions.

UNIT I   INTRODUCTION
Design of through type steel highway bridges for IRC loading - Design of stringers, cross girders and main girders - Design of deck type steel highway bridges for IRC loading - Design of main girders

UNIT II  STEEL BRIDGES
Design of pratt type truss girder highway bridges - Design of top chord, bottom chord, web members - Effect of repeated loading - Design of plate girder railway bridges for railway loading - Wind effects - Design of web and flange plates - Vertical and horizontal stiffeners.

UNIT III REINFORCED CONCRETE SLAB BRIDGES
Design of solid slab bridges for IRC loading - Design of kerb - Design of tee beam bridges - Design of panel and cantilever for IRC loading

UNIT IV  REINFORCED CONCRETE GIRDER BRIDGES
Design of tee beam - Courbon's theory - Pigeaud's curves - Design of balanced cantilever bridges - Deck slab - Main girder - Design of cantilever - Design of articulation

UNIT V  PRESTRESSED CONCRETE BRIDGES
Design of prestressed concrete bridges - Preliminary dimensions - Flexural and torsional parameters - Courbon's theory - Distribution coefficient by exact analysis - Design of girder section - Maximum and minimum prestressing forces - Eccentricity - Live load and dead load shear forces - cable zone in girder - Check for stresses at various sections - Check for diagonal tension - Diaphragms - End block - Short term and long term deflections.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE017 ARCHITECTURE AND TOWN PLANNING LT P C 3 0 0 3

OBJECTIVE
- To provide the basic knowledge on the principles of design of buildings relating to the environment and climate.

UNIT I ARCHITECTURAL DESIGN 8
Architectural Design – an analysis – integration of function and aesthetics – Introduction to basic elements and principles of design.

UNIT II SITE PLANNING 9
Surveys – Site analysis – Development Control – Layout regulations- Layout design concepts.

UNIT III BUILDING TYPES 12
Residential, institutional, commercial and Industrial – Application of anthropometry and space standards-Inter relationships of functions – Safety standards – Building rules and regulations – Integration of building services – Interior design

UNIT IV CLIMATE AND ENVIRONMENTAL RESPONSIVE DESIGN 8
Man and environment interaction - Factors that determine climate – Characteristics of climate types – Design for various climate types – Passive and active energy controls – Green building concept

UNIT V TOWN PLANNING 8
Planning – Definition, concepts and processes - Urban planning standards and zoning regulations - Urban renewal – Conservation – Principles of Landscape design

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE018  MUNICIPAL SOLID WASTE MANAGEMENT  L T P C  
3 0 0 3

OBJECTIVE

- This course covers the various sources and characterisation of municipal solid wastes and the on-site/off-site processing of the same and the disposal methods. The student is expected to know about the various effects and disposal options for the municipal solid waste.

UNIT I SOURCES AND TYPES OF MUNICIPAL SOLID WASTES 9
Sources and types of solid wastes – Quantity – factors affecting generation of solid wastes; characteristics – methods of sampling and characterization; Effects of improper disposal of solid wastes – Public health effects. Principle of solid waste management – social & economic aspects Public awareness; Role of NGOs; Legislation.

UNIT II ON-SITE STORAGE AND PROCESSING 9

UNIT III COLLECTION AND TRANSFER 9
Methods of Collection – types of vehicles – Manpower requirement – collection routes; transfer stations – selection of location, operation & maintenance; options under Indian conditions.

UNIT IV OFF-SITE PROCESSING 9
Processing techniques and Equipment; Resource recovery from solid wastes – composting, incineration, Pyrolysis - options under Indian conditions.

UNIT V DISPOSAL 9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVE

- The main objective of this course is to impart the principles involved in designing structures which have to store different types of materials. The student at the end of the course shall be able to design concrete and steel material retaining structures.

UNIT I STEEL WATER TANKS 12

UNIT II CONCRETE WATER TANKS 12

UNIT III STEEL BUNKERS AND SILOS 7

UNIT IV CONCRETE BUNKERS AND SILOS 7
Design of square bunker – Side Walls – Hopper bottom – Top and bottom edge beams – Design of cylindrical silo – Wall portion – Design of conical hopper – Ring beam at junction

UNIT V PRESTRESSED CONCRETE WATER TANKS 7
Principles of circular prestressing – Design of prestressed concrete circular water tanks

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
1. Ramaswamy G.S., Modern prestressed concrete design, Arnold Heinimen, New Delhi, 1990
BCE020 DESIGN OF PLATE AND SHELL STRUCTURES L T P C
3 0 0 3

OBJECTIVE
- At the end of this course the student shall understand the rudimentary principles involved in
  the analysis and design of plates and shells.

UNIT I THIN PLATES WITH SMALL DEFLECTION 9
Laterally loaded thin plates – governing differential equations – Simply supported and fixed boundary
conditions

UNIT II RECTANGULAR PLATES 9
Simply supported rectangular plates – Navier’s solution and Levy’s method.

UNIT III THIN SHELLS 9
Classification of shells-structural actions – membrane theory

UNIT IV ANALYSIS OF SHELLS 9
Analysis of spherical dome – cylindrical shells – folded plates

UNIT V DESIGN OF SHELLS 9
Design of spherical dome – cylindrical shells – folded plates

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
2. Chatterjee B. K., Theory and Design of Concrete Shells, Oxford & IBH, New Delhi, 1998
BCE021  TALL BUILDINGS  L T P C  3 0 0 3

OBJECTIVE
- This course deals with problems associated with large heights of structures with respect to loads (wind and earthquake and deflections of the structure). To know the rudimentary principles of designing tall buildings as per the existing codes.

UNIT I  INTRODUCTION  9

UNIT II  THE VERTICAL STRUCTURE PLANE  10

UNIT III  COMMON HIGH RISE STRUCTURES  10

UNIT IV  APPROXIMATE STRUCTURAL ANALYSIS & DESIGN OF BUILDINGS  9

UNIT V  OTHER HIGH-RISE BUILDING STRUCTURE  7

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE022  PREFABRICATED STRUCTURES  L T P C
                                                   3 0 0 3

OBJECTIVE

- This course shall be able to appreciate modular construction, industrialised construction and shall be able to design some of the prefabricated elements and also have the knowledge of the construction methods using these elements.

UNIT I       INTRODUCTION


UNIT II      PREFABRICATED COMPONENTS

Behaviour of structural components – Large panel constructions – Construction of roof and floor slabs – Wall panels – Columns – Shear walls

UNIT III     DESIGN PRINCIPLES

Disuniting of structures- Design of cross section based on efficiency of material used – Problems in design because of joint flexibility – Allowance for joint deformation.

UNIT IV      JOINT IN STRUCTURAL MEMBERS

Joints for different structural connections – Dimensions and detailing – Design of expansion joints

UNIT V       DESIGN FOR ABNORMAL LOADS

Progressive collapse – Code provisions – Equivalent design loads for considering abnormal effects such as earthquakes, cyclones, etc., - Importance of avoidance of progressive collapse.

TOTAL: 45 PERIODS

TEXT BOOKS

1. CBRI, Building materials and components, India, 1990

REFERENCES

BCE023  EXPERIMENTAL STRESS ANALYSIS  L T P C
             3 0 0 3

OBJECTIVE
- To introduce the student to the basic concepts and principles of various strain measuring instruments and model analysis.

UNIT I  STRAIN MEASUREMENT METHODS

UNIT II  MEASURING INSTRUMENTS

UNIT III  PHOTO ELASTICITY

UNIT IV  MODEL ANALYSIS

UNIT V  ADVANCED TECHNIQUES
Fundamentals of photo elastic coatings – Morie fringe and Brittle coating technique – crack detection techniques – Introduction to stress freezing technique – Introduction to nondestructive testings – Holography

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
2. Dove and Adam, “Experimental stress analysis and Motion measurements”, 1989
OBJECTIVE

- The main objective of this programme is to train the student in the use of computers and creating a computer code as well as using commercially available software for the design of Civil Engineering structures.

UNIT I  INTRODUCTION  
Fundamentals of CAD - Hardware and software requirements - Design process - Applications and benefits.

UNIT II  COMPUTER GRAPHICS  
Graphic primitives - Transformations - Wire frame modeling and solid modeling - Graphic standards – Drafting packages

UNIT III  STRUCTURAL ANALYSIS  
Fundamentals of finite element analysis - Principles of structural analysis - Analysis packages and applications.

UNIT IV  DESIGN AND OPTIMISATION  
Principles of design of steel and RC Structures - Applications to simple design problems – Optimisation techniques - Algorithms - Linear Programming – Simplex method

UNIT V  EXPERT SYSTEMS  
Introduction to artificial intelligence - Knowledge based expert systems - Rules and decision tables – Inference mechanisms - Simple applications.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
**BCE025**  INDUSTRIAL STRUCTURES  
**L T P C**  
3 0 0 3  

**OBJECTIVE**  
- This course deals with some of the special aspects with respect to Civil Engineering structures in industries. At the end of this course the student shall be able to design some of the structures.  

**UNIT I  PLANNING**  
Classification of Industries and Industrial structures – General requirements for industries like cement, chemical and steel plants – Planning and layout of buildings and components.  

**UNIT II  FUNCTIONAL REQUIREMENTS**  

**UNIT III  DESIGN OF STEEL STRUCTURES**  
Industrial roofs – Crane girders – Mill buildings – Design of Bunkers and Silos.  

**UNIT IV  DESIGN OF R.C. STRUCTURES**  
Silos and bunkers – Chimneys – Principles of folded plates and shell roofs.  

**UNIT V  PREFABRICATION**  
Principles of prefabrication – Prestressed precast roof trusses- Functional requirements for Precast concrete units.  

**TOTAL: 45 PERIODS**  

**TEXT BOOKS**  

**REFERENCES**  
BCE026 SMART STRUCTURES AND SMART MATERIALS

OBJECTIVE
- This course is designed to give an insight into the latest developments regarding smart materials and their use in structures. Further, this also deals with structures which can self adjust their stiffness with load.

UNIT I INTRODUCTION
Introduction to Smart Materials and Structures – Instrumented structures functions and response – Sensing systems – Self diagnosis – Signal processing consideration – Actuation systems and effectors.

UNIT II MEASURING TECHNIQUES

UNIT III SENSORS

UNIT IV ACTUATORS

UNIT V SIGNAL PROCESSING AND CONTROL SYSTEMS

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE027 AIR POLLUTION MANAGEMENT  

L T P C  
3 0 0 3  

OBJECTIVE  
- This subject covers the sources, characteristics and effects of air and noise pollution and the methods of controlling the same. The student is expected to know about source inventory and control mechanism.  

UNIT I SOURCES AND EFFECTS OF AIR POLLUTANTS 9  

UNIT II DISPERSION OF POLLUTANTS 9  

UNIT III AIR POLLUTION CONTROL 12  
Concepts of control – Principles and design of control measures – Particulates control by gravitational, centrifugal, filtration, scrubbing, electrostatic precipitation – Selection criteria for equipment - gaseous pollutant control by adsorption, absorption, condensation, combustion – Pollution control for specific major industries (Cement, Smelter, Pulp & Paper and Thermal Power Plant).  

UNIT IV AIR QUALITY MANAGEMENT 8  

UNIT V NOISE POLLUTION 7  
Sources of noise pollution – Effects – Assessment - Standards – Control methods – Prevention  

TOTAL: 45 PERIODS  

TEXT BOOKS  

REFERENCES  
BCE028 EARTHQUAKE GEOTECHNICAL ENGINEERING

OBJECTIVE
- The main objective of this course is to introduce to the student the phenomena of earthquakes, the process, measurements and the factors that affect the design of structures in seismic areas.

UNIT I ELEMENTS OF EARTHQUAKE SEISMOLOGY AND DYNAMICS 9

UNIT II GROUND MOTION CHARACTERISTICS 9

UNIT III GROUND RESPONSE ANALYSIS AND GROUND MOTION 9
Wave propagation Analysis – Site Amplification – Need for Ground Response Analysis – Shear Beam analysis – Methods of analyses – One Dimensional Analysis – Equivalent linear Analysis - Site effects – Design Ground Motion – Developing Design Ground Motion – Codal provisions

UNIT IV SEISMIC STABILITY ANALYSIS 9

UNIT V EARTHQUAKE HAZARD MITIGATION 9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BCE029 REPAIR AND REHABILITATION OF STRUCTURES

OBJECTIVE

- To get the knowledge on quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures, repairing of structures and demolition procedures.

UNIT I  MAINTENANCE AND REPAIR STRATEGIES  9
 Maintenance, repair and rehabilitation, Facets of Maintenance, importance of Maintenance various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration

UNIT II  SERVICEABILITY AND DURABILITY OF CONCRETE  11
 Quality assurance for concrete construction concrete properties- strength, permeability, thermal properties and cracking. - Effects due to climate, temperature, chemicals, corrosion - design and construction errors - Effects of cover thickness and cracking

UNIT III  MATERIALS FOR REPAIR  9
 Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, ferro cement, Fibre reinforced concrete.

UNIT IV  TECHNIQUES FOR REPAIR AND DEMOLITION  8

UNIT V  REPAIRS, REHABILITATION AND RETROFITTING OF STRUCTURES  8
 Repairs to overcome low member strength, Deflection, Cracking, Chemical disruption, weathering corrosion, wear, fire, leakage and marine exposure.

TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

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

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

UNIT II  TQM PRINCIPLES  9

UNIT III  TQM TOOLS & TECHNIQUES I  9

UNIT IV  TQM TOOLS & TECHNIQUES II  9

UNIT V  QUALITY SYSTEMS  9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
BGE003 INTELLECTUAL PROPERTY RIGHTS (IPR) L T P C

3 0 0 3

OBJECTIVES

• To create awareness on Intellectual Property Rights (IPR).
• To understand patents and copyrights.
• To know about application procedures of IPR

UNIT I TYPES OF PROPERTY 9

UNIT II PATENTS AND APPLICATION PROCEDURES 9
IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark
Registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical
Indications at national and International levels – Application Procedures.

UNIT III INTERNATIONAL PARTICES 9
International convention relating to Intellectual Property – Establishment of WIPO – Mission and
Activities – History – General Agreement on Trade and Tariff (GATT).

UNIT IV LEGISLATIONS AND POLICY 9
Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent
Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair
competition.

UNIT V CASE STUDIES 9
Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade
Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair
competition.

TOTAL: 45 PERIODS

TEXT BOOK

1. Subbaram N.R. “Handbook of Indian Patent Law and Practice “, S. Viswanathan Printers and

REFERENCES

   www.ipmatters.net/features/000707_gibbs.html.
BGE801 ENGINEERING ECONOMICS AND COST ANALYSIS  L T P C  3 0 0 3

OBJECTIVE
- To learn about the basics of economics and cost analysis related to engineering so as to take economically sound decisions.

UNIT I INTRODUCTION TO ECONOMICS  9

UNIT II VALUE ENGINEERING  9
Make or buy decision, Value engineering – Function, aims, and Value engineering procedure. Interest formulae and their applications –Time value of money, Single payment compound amount factor, Single payment present worth factor, Equal payment series sinking fund factor, Equal payment series payment Present worth factor- equal payment series capital recovery factor-Uniform gradient series annual equivalent factor, Effective interest rate.

UNIT III CASH FLOW  9
Methods of comparison of alternatives – present worth method (Revenue dominated cash flow diagram), Future worth method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), Annual equivalent method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), rate of return method.

UNIT IV REPLACEMENT AND MAINTENANCE ANALYSIS  9
Replacement and Maintenance analysis – Types of maintenance, types of replacement problem, determination of economic life of an asset, Replacement of an asset with a new asset – capital recovery with return and concept of challenger and defender, Simple probabilistic model for items which fail completely.

UNIT V DEPRECIATION  9

TOTAL: 45 PERIODS

TEXT BOOKS
REFERENCES