ABSTRACT OF THE SYLLABUS

I, II, III – Year Diploma in Civil Engineering

Annexure: I  
BOS: 12.5.2006  
(From 2007-08)

Teaching Schedule for I Year Diploma in Engineering. (Civil)

(A) THEORY COURSE

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Course No.</th>
<th>Subjects</th>
<th>Pds/Week</th>
<th>Marks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>BEN-111</td>
<td>English &amp; Communication Skills</td>
<td>02 -</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>02.</td>
<td>BMA-111</td>
<td>Engineering Mathematics-I</td>
<td>03 -</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>03.</td>
<td>BMA-112</td>
<td>Engineering Mathematics-II</td>
<td>02 -</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>04.</td>
<td>BPH-111</td>
<td>Engineering Physics</td>
<td>02 -</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>05.</td>
<td>BCH-111</td>
<td>Engineering Chemistry</td>
<td>02 -</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>06.</td>
<td>BME-114</td>
<td>Production Technology</td>
<td>02 -</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>07.</td>
<td>BEE-113</td>
<td>Electro Techniques</td>
<td>02 -</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>08.</td>
<td>BCE-111</td>
<td>Surveying-I</td>
<td>03 -</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>09.</td>
<td>BCE-112</td>
<td>Engineering Drawing</td>
<td>06 -</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>10.</td>
<td>BCE-113</td>
<td>Construction Materials</td>
<td>03 -</td>
<td>25</td>
<td>100</td>
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</tbody>
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TOTAL: 27 - 325 1000 1325

(B) PRACTICAL COURSES

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course No.</th>
<th>Subjects</th>
<th>Pds/Week</th>
<th>Marks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>BPH-181</td>
<td>Engineering Physics Lab.</td>
<td>02 -</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>02.</td>
<td>BCH-181</td>
<td>Engineering Chemistry Lab.</td>
<td>02 -</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>03.</td>
<td>BME-183</td>
<td>Workshop Practice</td>
<td>03 -</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>04.</td>
<td>BEE-181</td>
<td>Electrical Engineering Lab.</td>
<td>02 -</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>05.</td>
<td>BCE-181</td>
<td>Survey Lab. I and Camp*</td>
<td>03 -</td>
<td>75+50</td>
<td>50</td>
</tr>
</tbody>
</table>

TOTAL: 12 425 250 675

GRAND TOTAL: 27 12 750 1250 2000

Note: * A Survey Camp of about one week duration for extensive fieldwork.

Teaching Schedule for II Year Diploma in Engineering (Civil)
### (A) THEORY COURSES

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Course No.</th>
<th>Subjects</th>
<th>Pds/Week</th>
<th>Marks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L  P</td>
<td>Sessional</td>
<td>University</td>
</tr>
<tr>
<td>01.</td>
<td>BMA-211</td>
<td>Engineering Mathematics-III</td>
<td>02</td>
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</tr>
<tr>
<td>02.</td>
<td>BCE-211</td>
<td>Strength of Materials</td>
<td>02</td>
<td>25</td>
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<tr>
<td>03.</td>
<td>BCE-212</td>
<td>Construction Management**</td>
<td>02</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>04.</td>
<td>BCE-213</td>
<td>Surveying-II</td>
<td>02</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>05.</td>
<td>BCE-214</td>
<td>Civil Engineering Drawing</td>
<td>06</td>
<td>100</td>
<td>100</td>
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<tr>
<td>06.</td>
<td>BCE-215</td>
<td>Hydraulics</td>
<td>03</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>07.</td>
<td>BCE-216</td>
<td>Environmental Engineering</td>
<td>03</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>08.</td>
<td>BCE-217</td>
<td>Structural Design-I</td>
<td>02</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>09.</td>
<td>BME-218</td>
<td>Mechanical Engineering</td>
<td>02</td>
<td>25</td>
<td>100</td>
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<tr>
<td><strong>TOTAL:</strong></td>
<td></td>
<td></td>
<td>24</td>
<td>-</td>
<td>300</td>
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### (B) PRACTICAL COURSES

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Course No.</th>
<th>Subjects</th>
<th>Pds/Week</th>
<th>Marks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td>L  P</td>
<td>Sessional</td>
<td>University</td>
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<tr>
<td>01.</td>
<td>BCE-281</td>
<td>Construction Technology Lab ***</td>
<td>- 02</td>
<td>75+25</td>
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<tr>
<td>02.</td>
<td>BCE-282</td>
<td>Survey Lab. II and Camp*</td>
<td>- 06</td>
<td>100+50</td>
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<tr>
<td>03.</td>
<td>BCE-283</td>
<td>Hydraulics Lab.</td>
<td>- 02</td>
<td>100</td>
<td>50</td>
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<tr>
<td>04.</td>
<td>BCE-284</td>
<td>Environmental Engg. Lab.</td>
<td>- 02</td>
<td>100</td>
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<tr>
<td>05.</td>
<td>BCE-285</td>
<td>Computer Application Lab.</td>
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<td><strong>TOTAL:</strong></td>
<td></td>
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<td>24 15</td>
<td>550</td>
<td>250</td>
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<td><strong>GRAND TOTAL:</strong></td>
<td>24 15</td>
<td>850</td>
<td>1150</td>
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</table>

**Note:**

* A Camp of about ten days duration for extensive survey works in hilly region.

** The students must attend at least one Entrepreneur awareness camp (EAC).

*** Compulsory construction site visit and submission of report to be evaluated for 25 marks.

*Teaching Schedule for III Year Diploma in Engineering (Civil)*

### (A) THEORY COURSES
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Course No.</th>
<th>Subjects</th>
<th>Pds/Week</th>
<th>Marks</th>
<th>Total</th>
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<tbody>
<tr>
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<td>L</td>
<td>P</td>
<td>Sessional</td>
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<tr>
<td>01.</td>
<td>BCE-311</td>
<td>Structural Design-II</td>
<td>03</td>
<td>-</td>
<td>25</td>
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<tr>
<td>02.</td>
<td>BCE-312</td>
<td>Theory of Structures</td>
<td>03</td>
<td>-</td>
<td>25</td>
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<tr>
<td>03.</td>
<td>BCE-313</td>
<td>Irrigation Engineering</td>
<td>02</td>
<td>-</td>
<td>25</td>
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<tr>
<td>04.</td>
<td>BCE-314</td>
<td>Transportation Engineering</td>
<td>03</td>
<td>-</td>
<td>25</td>
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<tr>
<td>05.</td>
<td>BCE-315</td>
<td>Soil Mechanics</td>
<td>02</td>
<td>-</td>
<td>25</td>
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<tr>
<td>06.</td>
<td>BCE-316</td>
<td>Quantity Survey and Valuation</td>
<td>04</td>
<td>-</td>
<td>75</td>
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<tr>
<td>07.</td>
<td>BCE-318</td>
<td>Building Construction and Service</td>
<td>02</td>
<td>-</td>
<td>25</td>
</tr>
<tr>
<td>08.</td>
<td>BCE-319</td>
<td>Elective</td>
<td>02</td>
<td>-</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>BCE-319</td>
<td>(a) Hydraulic Structures</td>
<td></td>
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<tr>
<td></td>
<td>BCE-319</td>
<td>(b) Earthquake Engg.</td>
<td></td>
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<tr>
<td>09.</td>
<td>BCE-320</td>
<td>Environmental Studies</td>
<td>01</td>
<td>-</td>
<td>10</td>
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<td></td>
<td>TOTAL:</td>
<td>22</td>
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<td>260</td>
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(B) PRCTICAL COURSES

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Course No.</th>
<th>Subjects</th>
<th>Pds/Week</th>
<th>Marks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>P</td>
<td>Sessional</td>
</tr>
<tr>
<td>01.</td>
<td>BCE-381</td>
<td>S. M. &amp; Structure Lab.</td>
<td>-</td>
<td>02</td>
<td>75</td>
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<tr>
<td>02.</td>
<td>BCE-382</td>
<td>Concrete Lab.</td>
<td>-</td>
<td>02</td>
<td>75</td>
</tr>
<tr>
<td>03.</td>
<td>BCE-383</td>
<td>Soil Mechanics Lab.</td>
<td>-</td>
<td>02</td>
<td>75</td>
</tr>
<tr>
<td>04.</td>
<td>BCE-384</td>
<td>Civil Engg. Drawing &amp; CAD</td>
<td>-</td>
<td>03</td>
<td>100</td>
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<tr>
<td>05.</td>
<td>BCE-385</td>
<td>Survey Lab III</td>
<td>03</td>
<td>-</td>
<td>75</td>
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<tr>
<td>06.</td>
<td>BCE-386</td>
<td>Project and Camp*</td>
<td>04</td>
<td>-</td>
<td>200</td>
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<td></td>
<td></td>
<td>TOTAL:</td>
<td>16</td>
<td>-</td>
<td>600</td>
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<td></td>
<td></td>
<td>GRAND TOTAL</td>
<td>22</td>
<td>16</td>
<td>860</td>
</tr>
</tbody>
</table>

Note: *A Project Camp of about One Week duration for detailed survey work pertaining to field problems.

DETAILED SYLLABUS

1. ENGLISH & COMMUNICATION SKILLS

COURSE NO. BEN-111 Pds /Week = 02
SESSIONAL-25 PAPER – 100 TOTAL - 125

UNIT-I VOCABULARY

Word Formation: - Roots and Affixes, Affixation/derivation, Compounding.
Noun to Adjectives
Noun to Verb

**UNIT-II GRAMMAR**  
20%
Verb/Tense/Articles/Prepositions. Phrase Structure/Clause Structure
Expression- Transformations.

**UNIT-III: READING**  
20%
Local & Global Comprehension, Unseen passages/General Texts etc.

**UNIT-IV: WRITING**  
20%
(a) Description-Objects/Places
(b) Report Writing General & Technical Subjects, Lab Reports.
(c) Paragraph writing
(d) Letter/Application/C.V. Tips regarding interview

**UNIT-V: COMMUNICATIONS**  
20%
- Introducing a Guest-A Speaker, An Event
- Meeting a Stranger
- Asking the way
- At the post office
- At the Bank Counter etc.

Group Discussion & Debate. Communication: Importance, Types of communication, Barrier to communication.

*Syllabus – First Year*

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2. **MATHAMETICS – I**

**COURSE NO. BMA -111**  
Pds / Week = 03
**SESSIONAL-25**  
**PAPER – 100**  
**TOTAL-125**

**UNIT-I ALGEBRA**  
20%
Introduction - Partial fraction of a proper fraction and related problems.
Sequence and Series, Arithmetic progression, Arithmetic mean, Geometric progression and Harmonic progression, sum of infinite G.P Recurring decimals as infinite G.P problems on A.P. G.P and H.P

Binomial Theorem, properties of Binomial theorem and its applications

Determinates, Method for calculating determinant: Definition of minors and cofactors, properties of determinants and its applications

**UNIT-II Cramer’s Rule**

Trigonometrical ratios of the sum and difference of two angles. Trigonometrical ratios of multiple and submultiples angle. Conditional Trigonometrical identities. Trigonometrical equations

**UNIT-III**

Point, Cartesian and Polar co-ordinates and their conversion. Distance between two points. Internal and external division. Formulae, Area of triangle, conditions of co linearity of three points. Locus.

Equation of a straight line in various standard forms, Angle between Straight-lines, perpendicular distance formula.

Equation of circle in a standard form, center and radius, conditions. For a circle on a given diameter and problems. Definition conics, standard equation of parabola and ellipse.

**UNIT-IV**

Three Dimensional Geometry - Concepts of axes, planes, coordinate and distance between two points.

Direction ratios and direction cosines.

**Complex Number** - Introduction, standard form of complex number, conjugate complex. Number, square root and cube root of unity, triangular inequality.

**UNIT-V**


Scalar and dot product, work done as a scalar product, vector product or cross product, vector product expressed as a determinant and problem.

Moment of a force and magnitude, Angular velocity and problems.

BOOK: Applied Mathematics by Prof. V.K. Parashar

*Syllabus – First Year*

**3. MATHAMETICS – II**
UNIT-I: DIFFERENTIAL CALCULUS

Basic concept of theory of limit in order to clarify the concept of continuity which would lay the foundation for study of differentially and differentiation of functions and differentiation of functions.

First principle of differentiation, fundamental rule for differentiation, which allows us to find derivatives of functions directly without using definition. Differentiation of function. Differentiation of implicitly functions, logarithmic differentiation of infinite series, differentiation of parametric. Higher order derivatives (Simple)

UNIT-II
Application of derivatives, derivatives as a rate measurer, differentials, errors, and approximations, slope of a line i.e. geometrical meaning of dy/dx at a point and equations of tangent and normal at a point of the curve. Maximum and Minimum values of a function (in its co main).

UNIT-III: INTEGRAL CALCULUS:

Indefinite in integral (inverse process of differentiation), fundamental integration, formulas and standard rules of integration.

METHOD OF INTEGRATION:

(i) Integration by substitution

(ii) Integration by parts.

UNIT-IV
Integration of rational algebraic functions by using partial fractions.

Evaluation of Integral of various types by using standard.

Type 1. \[ \int \frac{dx}{ax^2+bx+c} \]

2. \[ \int \frac{dx}{\sqrt{ax^2+bx+c}} \quad \text{And} \quad \int \frac{dx}{\sqrt{(ax^2+bx+c)}} \]

3. \[ \int \frac{dx}{a \sin x + b \cos x} \quad \int \frac{dx}{a + b \sin x} \quad \int \frac{dx}{a + b \cos x} \]

UNIT-V
Definite integrals and application of Gamma function to evaluate integrals.

Application of Simpson’s rule.

**BOOK: Applied Mathematics by Prof. V.K. Parashar**

_Syllabus – First Year_

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**4. ENGINEERING PHYSICS**

<table>
<thead>
<tr>
<th>COURSE NO. BPH-111</th>
<th>PAPER – 100</th>
<th>TOTAL-125</th>
</tr>
</thead>
<tbody>
<tr>
<td>SESSIONAL-25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**UNIT-I**
Scalar and vector quantities, type of vectors, vector expressed in terms of position vectors. Multiplication of a vector by scalar, scalar and vector products of two vectors.

Applications of scalar and vector products in mechanics and electrodynamics.

Rigid body, rotational motion of a rigid body. Moment of inertia and radius of gyration.

Kinetic energy of rotating body, theorems of moment of inertia, calculation of moment of inertia of a thin uniform rod and a circular disc. 20%

**UNIT-II**

**UNIT-III**
UNIT-IV
Electric field $E$ (definition, units and representations by lines of forces), $E$ due to an isolated charge. Gauss’s law of electrostatics, derivation of Coulomb’s law from Gauss’s law, Determination of $E$ due to an infinite line of charges using Gauss’s law.

Definition of electric potentials $V$ and its derivation at a point due to an isolated charge, general relation between $E$ and $V$, electrical potential energy.

Lorentz force $F=|q(E+V\times B)$ definition of magnetic flux, flux of magnetic induction, Magnetic field $B$, unit of $B$, Ampere’s law ($\oint B\cdot dl=\mu_0 I$),

Biot- Savart Law, $B$ due to a straight conductor carrying current, configuration of magnetic field produced by circular coil carrying current, Magnetic moment of a magnet and tangent law. 20%

UNIT-V
Structure of solids, crystalline and amorphous solids, idea of lattice, packing in crystals, conductors, insulators, semi-conductors. p and n type semi conductors, superconductors.

Bohr’s theory of hydrogen atom, expression for energy of electron in different states. Excitation and ionization potentials. Mechanism of production of X-rays, continuous and characteristics X-rays, Duane and Hunt rule. Applications of X-rays.

The nucleus, nature of nuclear forces, natural radioactivity and disintegration laws, half life and mean life. Fission and fusion, nuclear reactor, energy generation in sun and stars. 20%

BOOKS
02. Physics for class XI and XII, N.K. Bajaj.
03. ABC Physics for class XI and XII
05. Physics for class XI and XII by Gogia, Pradeep Prakashan.
06. Physics for class XI and XII NCERT
5. ENGINEERING CHEMISTRY

COURSE NO. BCH-111

Pds/Week = 02

SESSIONAL - 25

PAPER – 100

TOTAL - 125

UNIT-I

20%

Origin and growth of organic chemistry, Catenation, Homologous series, Isomerism, Functional group, Hydrocarbons and their classification, Nomenclature of organic compounds by IUPAC system, Preparation and properties of Alkanes, Alkenes and Alkynes (Addition reaction, Substitution reaction and Elimination reaction etc.)

UNIT-II

20%

ELECTROCHEMISTRY, pH

VALUE AND BUFFER SOLUTION:

2.1 Metallic and electrolytic conductivity, Distinction between atoms and ions, Arrhenius theory of ionization, mechanism of electrolysis of fused electrolytes of aqueous solution of electrolytes, Faraday’s laws of electrolysis, problems based on these laws, Industrial application of electrolysis,( electroplating, electro refining electrometallurgy, electrotyping and manufacture of chemicals etc.)
2.2 Hydrogen ion concentration, pH value, definition and its importance as applied to Engineering, numerical problems based on pH value, Buffer solution, types of Buffer solution and mechanism of Buffer action.

UNIT-III
CORROSION, ALLOYS AND FUELS: 20%
3.1 Corrosion: Introduction, magnitude of corrosion problem, theories of corrosion, Galvanic cell action, protection of metals from corrosion, methods of applying Metallic coatings.
ALLOYS: Introduction, preparation of alloys, purpose of making alloys, general properties and classification of alloys, Composition, properties and Engineering application of Brass, Bronze, Gunmetal, Constantan, Duralumin.
FUELS:
3.2 Introduction, classification of Fuels, Calorific values, Experimental determination of Calorific value of fuels by Bomb calorimeter, Coal: Classification of coal.

Syllabus – First Year

UNIT-IV
WATER AND ENVIRONMENTAL CHEMISTRY: 20%

UNIT-V
ENVIRONMENTAL CHEMISTRY 20%
5.1 Environmental segments, atmospheric regions, Chemical species and particulate present in the atmosphere, radiation balance, Lapse rate and temperature inversion Green house effect, formation and depletion of ozone in the atmosphere, acid rain.

Air pollution, types of air pollutant. Water pollution, types of water pollutants. Sewage, Testing of Sewage, Biochemical Oxygen Demand (BOD) and Chemical oxygen Demand (COD)

POLYMERS:

5.2 Introduction, classification of polymers, types of polymerization reactions, plastics & Resins, constituents of plastics Preparation, properties and uses of Polythene, Teflon, Polystyrene, PVC, Bakelite, Rubber, types of Rubber, Vulcanization of rubber, preparation, properties and uses of Buna-S and Buna- N rubbers.

BOOKS – RECOMMENDED

01 Polytechnic Chemistry by V.P Mehta.

02 Basic Applied Chemistry by P.C.Jain and Monica Jain.

03 Environmental Chemistry by B.K.Sharma.

04. Text Book of Engg Chemistry by S.S Dara

Syllabus – First Year

6. PRODUCTION TECHNOLOGY

Course No. : BME – 114/BPE-114

| Sessional = 25 | Paper = 100 | Periods/week = 02 | Total = 125 |


CARPENTRY: Kinds of timer, Preservation and seasoning of timber, Diseases and defects in timber. Soft wood and Hard wood, Carpentry tools such as marking & Measuring tools, cutting tools : Saws,
chisels & gouged, Planning tools: Iron jack plane & trying plane, Boring tools, Setting & sharpening of tools, Carpentry joints. 20%

UNIT-2 PLUMBING
Introduction, Fluming tools & equipments: Pipe vice, wrenches, dies, taps & pipe bending equipments, Pipe specifications, Materials of pipes, Different types of pipes and fittings, forming of various kinds of joints, Layout plans of pipes, Testing of pipelines and joints against leakage. 20%

UNIT-3 SMITHY
Brief description of tools and equipments used in cold and hot working processes. Safety measures to be observed in Smithy shop, Advantages and disadvantages of cold and hot working. Forgeable materials and Forging, temperature, forging operations like drawing down, upsetting, sending and Cutting, forge welding, Forging defects & inspection. 20%

UNIT-4 WELDING
Theory of gas and electric are welding, Types of welding electrodes, Selection of electrodes & fluxes, Filler rods, Edge preparation. Welding defects; gas cutting process. 20%

UNIT-5 SHEET METAL
Introduction, Metals used in sheet metal work, Black Iron, Galvanized iron, A1 sheets, Tin sheets, Stainless Steel sheets, Brief description of hand tools, sheet metal operations, Measuring & marking, Sheering & bending operations, Difference in Cutting & Shearing, Soldering & Brazing, Preparation of joints, folded sheet metal joints, e.g. seam ham, etc. Brief idea of riveting. 20%

Syllabus – First Year

7. ELECTRO TECHNIQUES
Course No.: BEE – 114
Periods/week = 02
Sessional = 25 Paper = 100 Total = 125

UNIT-1 Fundamentals of electric Circuit

20%

UNIT-II Alternating current fundamentals

Concept of alternating quantities. Nature of alternating voltage and current. Sinusoidal equations. Different standard values (instantaneous, maximum, average, r. m. s.) with derivation. Phasor representation, phasor diagram, lagging and leading quantities. Simple problems. 20%

UNIT-III A.C. Circuits

Power in an a. c. circuit, power factor, active and reactive current. Relationship between current and voltage in purely resistive, inductive and capacitive reactances, basic principle of single and three phase transformers. Phase sequence, star and delta connections, line and phase values, phasor diagrams. 20%

UNIT-IV Electrical wiring and Installation

Introduction, systems of distribution of electrical energy, types of wiring, wires and cables, conductor materials used in cables, insulation and its types, types of cables used for internal wiring, load calculation and cable selection, conduits accessories and fittings, basics of fuse systems. 20%

UNIT-V Lighting Schemes

Introduction, lighting accessories and fittings, lighting schemes, types of electric lamps, tungsten filament lamps, fluorescent tubes and sodium vapor lamps. Layout of lighting schemes, fancy lighting street lighting and decorative lighting. 20%

Books Recommended

1. Fundamentals of electrical Engg. (Ashfaq Husain)
2. A text hook of electrical Technology (B.L. Theraja & A.K. Theraje)
8. **SURVEYING – I**

**COURSE NO. BCE-111**

**Pds/ Week = 03**

**SESSIONAL-25**

**PAPER – 100**

**TOTAL-125**

**UNIT-I**

**General:** Definition of surveying. Distinction between plane and geodetic surveying. Principles of surveying. Classification of surveying.


**UNIT-II**

**Compass Surveying:** Types of meridians and bearings. Systems of measurement of bearings. Conversion of bearings from one system to the other. Construction and working of Prismatic and Surveyor’s compass. Compass traversing. Closing error and its graphical adjustment. Determination of included angles from bearings and vice-versa. Local attraction and correction of affected bearing. Magnetic declination. Angle of dip. 20%

**UNIT-III**

**Plane Table Surveying:** Accessories and methods of Plane Table surveying. Advantages and disadvantages of Plane table surveying. Three point problem (Mechanical and Lehman’s method). Two point problem. Errors in Plane table surveying. 20%

**UNIT-IV**

**Leveling:** Definition of terms related to leveling. Brief description of Dumpy, Tilting and I.O.P. levels. Temporary and permanent adjustments of Dumpy, Tilting and I.O.P. levels. Methods of calculation of reduced levels. Profile leveling. L-section, Cross-section and Formation lines. Precautions and errors in leveling. 20%

**UNIT-V**

**Theodolite Surveying:** Description of a transit theodolite. Definition of terms. Temporary adjustments of theodolite. Methods of reading horizontal and vertical angles. Least count calculations.

**Trigonometrical Leveling:**
Determination of height and distance with theodolite observations.

**Minor Instruments:** Handling and uses of (i) Ghat tracer (ii) Box sextant (ii) Indian pattern clinometers (iv) Pantograph (v) Abney level. 20%

_Syllabus – First Year_

## 9. ENGINEERING DRAWING

Course No. BCE-112

<table>
<thead>
<tr>
<th>100</th>
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<tbody>
<tr>
<td>Paper</td>
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### UNIT-I PRINTING AND SCALES:

(20)

**Introduction:** Need and importance of Drawing as the language of an Engineer. Selection and handling of the drawing instruments and equipments.

**Printing:** Importance of good printing. Single stroke printing I Capitals, Sub-capitals, small, verticals and italics, with and without serif. Block printing (5:7 types). Printing through stencil plates (in Sessional Practice only).

**Scales:** Need of a Scale, Representative Fraction (R.F.) and types of Scales according to the R.F. Construction of Plain, Diagonal and Vernier Scale. Demonstration of Ammonia Printing Machine.

### UNIT-II ORTHOGRAPHIC PROJECTIONS:

(20)


I-Angle (Orthographic) Projections of right solid prisms (including cylinder) and pyramids (including cone).

### UNIT-III ISOMETRIC AND PERSPECTIVE VIEWS:

(20)

**Isometric Views:** Simple right solids, English Alphabet, 3-Stairs Block and model of simple machine parts.

**Perspective Views:** Two-point Perspective of plane lamina, right solids and simple blocks.

### UNIT-IV BUILDING DRAWING:

(40)

**Types of foundation** Spread, Isolated, Column &dwarf wall footing.
Types of floors — Brick, Cement concrete, Mosaic, Marble, Stone & Basement Floor

Wall Section: Wall Sections through Door, Window or Arch opening.

Residential Building: Plan, Front Elevation and Section of 2-roomed, single storied residential building.

Syllabus – First Year

10. CONSTRUCTION MATERIALS

Course No. : BCE-113  Periods/week = 03
Sessional – 25  Paper = 100  Total = 125

UNIT-I:
Stones: Introduction, requirements of good building stones uses and classifications, stone cladding, modern use of stone tiles in architectural works, artificial or cast stones.

Bricks and Clay Products:
Bricks, Composition of bricks, requirements of first class (good bricks), classification of bricks as per BIS, properties of burnt clay bricks, tests for bricks, special bricks.

Building Tiles: Introduction to fire bricks and ceramic tiles. 20%

UNIT-II:
Lime: Introduction, lime as one of the cementing materials, classification of lime, storage and uses of lime.

Aggregates: Introduction, types, classification, standard specification as per BIS.

Mortar: Function and utility of mortar, types of mortars.

Cement: Definition, brief description of manufacturing Portland cement, physical properties, tests for cement, standard specifications for Portland cement, uses of different types of cement, storage of cement. 20%

UNIT-III:
Timber: Introduction, properties of good timber, identification of timber, preservation of timber, some common timbers and their uses in Civil Engineering Works.
Wood based Products: Veneers, plywood, plywood grades and sizes (IS-303-1975), hard board, particle board, block board, battle board, laminated board.

Paints, varnishes and distempers: Glossary of terms, purpose and uses, desirable properties of paints, some common constituents, types of paints, painting defects, causes and remedies, snowcem and its uses. 20%

Syllabus – First Year

UNIT-IV:
Metals: Glossary of terms, introduction, properties and uses of cast iron, wrought iron, steel, mild steel, high tensile steel, commercial forms of steel and aluminum.
Asphalt, tar and bitumen: Description and uses of asphalt, tar and bitumen.
Asbestos: Introduction, specifications, uses of asbestos in civil engineering works.
Plastic: Introduction and definition, uses of plastic in construction, plastic building products produced in India, modern developments in plastics.
Glass: Function and utility of glass, types of glasses and their uses, selection of glass.
Admixtures: Definition, function and utility of admixtures, types of admixtures. 20%

UNIT-V:
BUILDING CONSTRUCTION
Masonry Work: Technical terms, header, stretcher, bond, course, bed, facing, face, backing, hearting, joint, bat, closers, perpends, frog, quoin, plinth, plinth course, sill, jamb, reveal, string course, cornice, corbel.
Bond: Definition and purpose of bond, common types of bond.
Damp Proofing: Sources of dampness, methods of its prevention, material used in D.P.C.
Foundations: Definition and purpose of foundation, types of shallow foundation, design of spread footings. 20%
(B) LAB COURSES

1. ENGINEERING PHYSICS (LAB)

Course No. : BPH - 181                  Periods/week = 02
Sessional – 75                         Paper = 50                        Total = 125

01 (a) To determine the volume of the material in a given cylinder by Vernier Calipers.
        (b) To determine the density of the material of the given wire by screw gauge and physical balance.

02. To find the radius of curvature of a concave mirror by Spherometer and to verify the result by one pin method.

03. To determine the coefficient of friction between wood and glass and to plot a graph between frictional force (F) and normal reaction (R).

04. To find the weight of a given body using the law of parallelogram of vectors.

05. To verify the Boyle’s law and to plot a graph between P and 1/V.

06. To study the variation of time period (T) with length (l) of a simple pendulum and hence to determine the value of g at Aligarh by plotting L-T² graph.

07. To determine the refractive index of the material of the prism by angle of minimum derivation method.

08. To determine the moment of inertia of an irregular body with the help of inertia table.

09. To determine the specific resistance of the material of given wire using post office box.
10. To determine the value of Young’s modulus of elasticity of the material of the given wire by Sealer’s Apparatus.

11. To study the variation of resistance with temperature of the given semi-conductor.

12. To determine the refractive index of the glass with the help of a traveling microscope.

13. To determine the focal length of a convex lens by two-pin method.

14. To determine the coefficient of thermal conductivity of the material of the cylinder by Searle’s Apparatus.

15. To determine the frequency of the tuning fork by monometer.

16. To determine mechanical equivalent of heat (J) by friction cone method.

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Syllabus – First Year

2. ENGINEERING CHEMISTRY (LAB)

Course No. : BCH - 181

Periods/week = 02
Sessional – 75   Paper = 50   Total = 125

1. Preparation of standard solution.
   (a) How to use a chemical balance to weigh up to four decimal places.
   (b) Calculation and preparation of standard solutions of different strength’s and different chemicals.

2. Acid base titration.

3. Oxidation Reduction (Redox) titration.

4. Determination of total hardness of water by versinate method
   (a) Preparation of Standard CaCl₂ solution
   (b) Standardization of versenate solution.
   (c) Determination of total hardness.
   (d) Determination of permanent hardness.

5. Preparation of polymers
(a) Preparation of urea-formaldehyde resin (used in paper industry).

(b) Preparation of Phenol, formaldehyde resin (Backlit)

6. Paper chromatography (separation of mixture components and calculation of Rf value of different components)

7. Analysis of cations.

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3. **WORK SHOP PRACTICE**

**Course No. : BME - 181**

<table>
<thead>
<tr>
<th>Sessional</th>
<th>Paper</th>
<th>Total</th>
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<tbody>
<tr>
<td>75</td>
<td>50</td>
<td>175</td>
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</table>

**Periods/week = 03**

**Sessional = 75**

**Paper = 50**

**Total = 175**

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**1. FITTING SHOP**

Introduction to fitting, common materials used in fitting shop, identification of materials. Description and demonstration types of work holding benches, devices and files. Marking of jobs, use of markings and measuring tools.

Excise-1

Filing a dimensional rectangular/ square piece from a mild flat steel flat

Introduction to various tools for chipping and hack sawing.

Demonstration of chipping and hack sawing operations, different types of blades uses of blades, methods of fittings of blades.

Excise-2

Making a cut out from a square rectangular piece-using hacksaw.

Description and demonstration of various types of drills, tap, and dies. Selection of dies for tapping and dieing operations.

Excise-3
Making threads (internal/external) on a job by manual tapping and dieing

Care & maintenance of measuring tools like calipers, micrometer, Vernier caliper, height gauge, and combination set checking zero error and finding least count.

Exercise-4

Production of a utility job involving all the above operations.

2. CARPENTARY SHOP

Introduction to various types of wood by demonstration and their identification.

Demonstration, function and use of commonly used hand tools.

Care and maintenance of tools, safety measures to be observed.

Exercise-1

Marking, sawing and planning practice.

Exercise-2

Extensive planning practice and chiseling practice.

Introduction to carpentry joints, their relative advantages and uses

Exercise-3

Preparation of a half lap joint

Exercise-4

Preparation of Mortise and tennon joint

Exercise-5

Preparation of dovetail and glued joint

Exercise-6

Preparation of Mitre joint

Note any four jobs to be completed
3- SMITHY SHOP

Demonstration and detailed explanation of tools and equipments used. Forging operations.

Precautions to be observed

Bending operations, drawing out and preparation tools used

Exercise-1

To forge a L-hook

Description and specification of blowers, anvils, swage blocks and hammers

Exercise-2

Up setting at ends only.

Demonstration and description of tongs, fullers, swages

Exercise-3

To forge square on one/both ends of a circular rod.

Forge welding, defects in forging and inspection

Exercise-4

To forge a ring (by forge welding) out of a round MS bar.

4. SHEET METAL SHOP

Introduction of tools and equipments used for sheet metal work

Exercise-1

Preparation of lap joint by riveting, chaulking and fullering.

Introduction to soldering and brazing, demonstration of brazing by the instructor

Exercise-2,3

At least two exercise of sheet metal work involving, boxing, conduit bending, soldering, brazing.

Exercise-4.5

At least two exercise on joints of sheet metal work e.g. scam, hem, grooved joints.
5. PLUMBING SHOP

Introduction to pipes and pipe fillings, their specification

Demonstration, function and use of plumber’s tool and equipments.

Exercise-1

Practice on external and internal threading.

Demonstration of various joints by the instructor.

Exercise-2

Preparation of right angled pipe joints.

6. PAINTING SHOP

Exercise-1 Preparation of surface

Exercise-2 Application of primer coat

Exercise-3 Polishing on wood items

Exercise-4 Painting wooden items

Exercise-5 Painting steel items

Exercise-6 Painting of jobs by brush, roller and spray.

Syllabus – First Year

4. ELECTRICAL INSTALLATION LAB

Course No. : BEE – 181

Periods/week = 02

Sessional – 75 Paper = 50 Total = 125
1. (a) To control one lamp with one switch.  
   (b) To control two lamp in series, two lamps in parallel and one alone.

2. (a) Study of stair case lighting system using two-way switch.  
   (b) Study of Intermediate switch and its application in corridor lighting system.

3. To make connections for gallery lighting.

4. (a) To make connection for 230V bell.  
   (b) To make connection for 6V bell using 230/6V transformer.  
   (c) To make connection for bell with indicator.

5. Study of various types of wires and cables used in domestic wiring.  
   (a) Measurement of SWG of the wires.  
   (b) Practice in making ‘T’ and Mesh joint.

6. Practice in making Plastic Casing-Capping wiring for one point.

7. Practice in making P.V.C. conduit wiring for one point.

8. Testing of following fault of electrical installation by Megger.  
   (i) Open circuit fault  
   (ii) Short circuit fault  
   (iii) Earth leakage test.

9. To make connection for a fluorescent tube light and to study the function of choke and starter.

10. (a) To make connection of an Energy Meter.  
    (b) To measure energy consumed by a 200W/500W load in given time.  
    (c) To measure error in the meter.

11. Verification of Ohm’s law and plotting of V-I curve.

12. (a) Study of various types of multimeters.  
    (b) Measurement of resistance with the help of analog and digital multimeters.

13. (a) To measure the resistance of heating element of the kettle.  
    (b) To determine the efficiency of electric kettle.

5. SURVEY LAB - I & CAMP

Course No. : BCE - 181 Periods/week = 02
Sessional – 75 + 50 = 125 Paper = 50 Total = 175

I- Chain Survey
1. Folding & unfolding of chains
2. Ranging Of Lines
3. Offsetting
4. Offsetting with 90 turn
5. Offsetting with tie line turn
6. Traversing with Chain

II - Compass Survey
7. Measurements of Bearing
8. Measurements of included angles from bearings
9. Traversing with Compass
10. Graphical Adjustments

III - Plain Table Survey
11. Radiation Method
13. Intersection Method
14 Traversing
15 Two - Point problems
16 Three – Point problem

IV - Leveling
17. Rise & Fall method
18. Height of Instrument method
19. Profile Leveling
20. Cross Sectioning

V -Theodolite Survey
21. Measurements of horizontal angles
22. Measurements of vertical angles

Syllabus – First Year

II Year Diploma in Engineering (Civil)

Teaching Schedule for II Year Diploma in Engineering (Civil)

(A) THEORY COURSE

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Course No.</th>
<th>Subjects</th>
<th>Pds/Week</th>
<th>Marks</th>
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<td>01.</td>
<td>BMA-211</td>
<td>Engineering Mathematics-III</td>
<td>02</td>
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<td>02.</td>
<td>BCE-211</td>
<td>Strength of Materials</td>
<td>02</td>
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<tr>
<td>03.</td>
<td>BCE-212</td>
<td>Construction Management**</td>
<td>02</td>
<td>25</td>
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<td>04.</td>
<td>BCE-213</td>
<td>Surveying-II</td>
<td>02</td>
<td>25</td>
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<tr>
<td>05.</td>
<td>BCE-214</td>
<td>Civil Engineering Drawing</td>
<td>06</td>
<td>100</td>
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<td>06.</td>
<td>BCE-215</td>
<td>Hydraulics</td>
<td>03</td>
<td>25</td>
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<td>07.</td>
<td>BCE-216</td>
<td>Environmental Engineering</td>
<td>03</td>
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<td>08.</td>
<td>BCE-217</td>
<td>Structural Design-I</td>
<td>02</td>
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<td>Mechanical Engineering</td>
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(B) PRACTICAL COURSES

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<tr>
<td>01.</td>
<td>BCE-281</td>
<td>Construction Technology Lab ***</td>
<td>- 02</td>
<td>75+25</td>
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<tr>
<td>02.</td>
<td>BCE-282</td>
<td>Survey Lab. II and Camp*</td>
<td>- 06</td>
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<td>BCE-283</td>
<td>Hydraulics Lab.</td>
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<td>Environmental Engg. Lab.</td>
<td>- 02</td>
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<td>05.</td>
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<td>Computer Application Lab.</td>
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Note:  * A Camp of about ten days duration for extensive survey works in hilly region.

** The students must attend at least one Entrepreneur awareness camp (EAC).

*** Compulsory construction site visit and submission of report to be evaluated for 25 marks.

**DETAILED SYLLABUS**

**(A) THEORY COURSE**

1. **ENGINEERING MATHEMATICS-III**

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<tr>
<th>UNIT-I</th>
<th>MATRICES:</th>
<th>20%</th>
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<tbody>
<tr>
<td>Types of matrices, addition and subtraction of matrices Multiplication of matrices and problems.</td>
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<tr>
<td>Adjoin of square matrices problems.</td>
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<tr>
<td>Inverse of a matrix inverse matrix with the help of adjoin matrix and problems.</td>
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<tr>
<td>Solution of simultaneous equations, application of inverse matrix and problems.</td>
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<tr>
<th>UNIT-II</th>
<th>DIFERENTIAL EQUATIONS:</th>
<th>20%</th>
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<tbody>
<tr>
<td>Definition of differential equation, order and degree of differential equations, problems.</td>
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<tr>
<td>Solution of differential equation, differential equation of first order and first degree problems.</td>
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</table>
Variable separable, homogeneous differential equation; reducible to homogeneous form.

Linear differential equation and equations reducible to linear.

UNIT-III  DIFFERENTIAL EQUATIONS CONT.  12%

Exact differential equations and equations reducible to exact form and problems.
Simple application of differential equation and problems.

BOOLEAN ALGEBRA  8%

Introduction of number system, decimal, binary octal & hexa decimal

UNIT-IV  STATISTICS:  20%

Recall of frequency distribution and its graphical representation through bar diagram, Pi-chart etc. Different method of calculating mean, Medium Mode, Geometric mean, Harmonic mean, Partition values, Standard deviation and variance for grouped and ungrouped data, mean deviation for ungrouped and grouped data, probability and probability distribution (Introductory concepts).

UNIT-V  LAPLAC’S TRANSFORM:  20%

Definition and notations, important formulae, properties of Laplac’s transformation, shifting theorems, Inverse Laplac’s transformation.

BOOKS  Applied Mathematics by Prof. V.K.Parashar.

Syllabus – Second Year

2. STRENGTH OF MATERIALS

Course No.: BCE - 211  Periods/week = 02
Sessional – 75  Paper = 50  Total = 125

UNIT-I  SIMPLE STRESSES AND STRAINS  (25%)
Introduction, Types of stresses and strains (Tensile, Compressive and shear), Hook’s law, Permissible stresses; Principle of superposition
Composite Sections; Thermal stresses; Poisson's ratio, volumetric strain; Complementary shear stress, state of pure shear, Elastic modulus with their relationship; stresses in thin cylindrical shells.

UNIT-II  SHEAR FORCE AND BENDING MOMENT  (20%)
Types of support, types of beams, and types of load.
Shear force and bending moment. SFD and BMD for cantilevers, simply supported and overhanging beams for concentrated and uniformly distributed load.
Relationship between S.F. & B.M.

UNIT-III (a)  Geometrical Properties of Area  (20%)
Centre of area or centroid, Moment of inertia and second moment of area, radius of gyration
Theorem of parallel and perpendicular axes
Second moment of area of rectangular, circular, channel, T, I, L and built-up sections.
(a)  Theory of Bending
Bending stress \( \sigma \) assumptions, moment of resistance, derivation for bending equation to design of beams.

UNIT-IV  STRUCTURAL STEEL CONNECTIONS  (20%)
Description of riveted and welded joints
Design of riveted and welded joints
Columns: (Long and Short), Failure of columns, effective length and slenderness ratio
Use of simple column formulae for long and short column with different end conditions.

UNIT-V  FRAMES  (15%)
Introduction,
Types of frame
Determination of forces in simple trusses by the method of joints and method of sections.

BOOKS
Strength of Materials - S. Ramamurthum; R.S. Khurmi; B.C. Punmia; Rajput; W A Nash

Syllabus – Second Year

3. CONSTRUCTION MANAGEMENT

COURSE NO. : BCE 212  Pds. /Week= 02
Sessional-25  Paper - 100  Total Marks = 125

Unite I: Introduction: Significance, main objectives & functions of construction management
Classification & stages in construction. The Construction team: owner, engineer & contractor.
Recourses for Construction: men machine, material, money & management.

Construction Planning: Objective, principles advantages, analysis, limitation and stages of planning for construction projects.
**Construction Scheduling:** Preparation of Construction schedule for labour, material, machine & finance.

**Unit II**

**Project Management I: Introduction** to network techniques Inter relationship of events, activities dummy activities. Fulkerson’s rule for numbering events. Time estimates. Slack difference between PERT & CPM. Analysis of CPM network. Identifying critical activities and critical path.

**Site organization:** Principle of storing and Stacking of material at site Location of equipment, urgent labour at site.

**Unit III**

**Project Management II:** Float: different types of floats Calculation of float in a network.

**Control of Progress:** Project supervision. Method of recording progress. Analysis of progress. Taking corrective action during control of progress.

**Entrepreneurship:** Entrepreneur, function & qualities of entrepreneur.

**Purchase Department:** Objectives, activities, duties & functions of purchase department.

**Unit IV**

**Time Cost Optimization:** Direct, indirect and total project cost. Normal & Crash cost & Time. Cost – time optimization through CPM techniques for simple jobs.


**Unit V** **Management of Construction:** Introduction, factors affecting selection of construction equipment. Planning of infra structure for mechanization.

**Material Management:** Importance, objectives, functions and uses of materials management.

**Construction disputes & their settlement:** Introduction, categories of disputes, modes of settlement of disputes.

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4. **SURVEYING – II**
Course No. : BCE - 213  
Periods/week = 02

Sessional – 25  
Paper = 100  
Total = 125

UNIT-I  
20%


UNIT-II  
20%

(a) Leveling: (i) Sensitiveness of a bubble tube. (ii) Reciprocal leveling (iii) Effects of earth’s curvature and refraction in leveling.

(b) Tachometric Surveying:  Suitability of tachometric surveying. Specifications of a Tachometer and stadia rod. Fixed hair system of Tachometric surveying with line of sight (i) Horizontal and (ii) Inclined and staff held vertical at a point. Determination of tachometric constants.

UNIT-III  
20%


(b) Trigonometrical Leveling: Introduction, Measurement of heights and distances when (i) Base of the object accessible (ii) Base of the object inaccessible and instrument in the same vertical plane as the object (iii) Base of the object inaccessible and instrument station is not in the same vertical plane as the elevated object.

UNIT-IV  
20%

Curves: Necessity. Sketches and suitable uses of various types of curves in horizontal and vertical plane.

Simple Circular Curve: Elements of simple circular curve. Degrees of the curvature. Necessary calculations and methods of layout of a simple circular curve by

(a) Linear Methods: (i) Offsets from long chord. (ii) Offsets from tangent (iii) Successive bisection of chords/arc (iv) Offsets from chord produced.

(b) Angular Methods: (i) Rankine’s one Theodolite method (ii) Rankine’s two Theodolite method.

(c) Compound Curve: Elements of a compound curve. Method of layout of a compound curve by deflection angles. Checks for the accuracy of layout of the curve.

UNIT-V  
20%


Syllabus – Second Year
5. CIVIL ENGINEERING DRAWING

COURSE NO.: BCE-214

Pds/ Week = 06

SESSIONAL = 100

PAPER = 100

TOTAL = 200

UNIT-I

25%

Plan, Elevation and Sectional side elevation of a paneled, glazed and flush doors, window and ventilator, Aluminum door
Commonly used of staircases.
(i) Dog legged (ii) Quarter turn (iii) Bifurcated (iv) Rise & tread staircase. Foundation layout plan showing footing up to super structure.

UNIT-II

25%

Commonly used trusses (King Post, Queen Post & Fink roof truss)

A set of toilet with septic tank & soak pit.

Detailed drawing of pipe, slab and box culvert

UNIT-III

50%

Plan, elevation and sectional elevation of a single storied/ Doubled Storied building (including load bearing/frame structure)

Practice for planning of simple residential buildings on a given plot according to local building byelaws.
6. **HYDRAULICS**

**COURSE NO.: BCE-215**

**Pds/ Week = 03**

**SESSIONAL = 25**

**PAPER = 100**

**TOTAL = 125**

**UNIT-I**


**FLUIDS STATICS:** Fluid pressure, pressure intensity and pressure Head. Derivation and Application of Basic Formula for pressure intensity. Vacuum and Atmospheric Pressure, Absolute and Gauge Pressure Measurement of fluid pressure by piezometers and U-tube Manometers.

**HYDROSTATIC FORCE ON SURFACES:** Total Hydrostatic Force on a plane immersed Surface and Centre of Pressure. Simple applications. 20%

**UNIT-II**

**FLOW OF WATER:** Types of flow, Reynolds and Froude numbers: Discharge and Equation of Continuity. Velocity Head and Total Head, Bernoulli’s theorem. Venturimeter.

**ORIFICES:** Definition and Types of Orifices. Hydraulic Coefficients. Large Vertical Rectangular Orifice. Free, drowned and partially drowned orifices

Time of emptying tanks of uniform cross section by a single orifice, without inflow. 20%
UNIT-III

MOUTHPIECES: Definition and Types of Mouthpiece. Discharge through an external cylindrical mouthpiece.


BROAD CRESTED WEIR, DROWNED WEIR: Derivation of formula for head loss due to sudden expansion and its simple applications.

20%

UNIT-IV

FLOW THROUGH PIPES: Friction in pipes. Loss of head due to friction. Sudden expansion and sudden contraction; Entrance; Exit; Obstruction in change of direction (without derivation). Flow through parallel (forked) pipes. Flow from one reservoir to another through a long pipe of uniform and composite section.

20%

UNIT-V

OPEN CHANNEL FLOW: Geometry of Channel and Geometric Elements.

Flow Formulae for Open Channels: Chezy’s, Manning’s and Kutter’s.

Depth of maximum discharge and most economical section for rectangular, triangular and trapezoidal channels.


20%

Syllabus – Second Year

7. ENVIRONMENTAL ENGINEERING

COURSE NO.: BCE-216 Pds/ Week = 03
SESSIONAL = 25 PAPER = 100 TOTAL = 125

UNIT-I

A – WATER SUPPLY ENGINEERING

Estimate of Supply:
Demand for various purposes, factors affecting demand, variation in rate of demand, Basic concepts of environmental Chemistry.

**Quality of water:**

**UNIT-II** Treatment Processes:
Plain Sedimentation. Elementary Concept of design of sedimentation tanks. Coagulation, Commonly used Coagulants. Filtration, Disinfection of water, Method of disinfection, disinfection by chlorine.

**Softening:**
Chemical precipitation processes.

**Distribution System:**
Gravity System, pumping system and dual system. Layout of distribution system (Dead end, grid iron, circular, radial).

**B – WASTE WATER ENGINEERING**

**UNIT-III** Classification of wastewater, Waste-water Characteristics (Physical, Chemical) Microbiology of sewage, BOD Kinetics, BOD determination in laboratory, wastewater effluent standards.

**UNIT-IV** Collection Systems:
Separate, partially separate and combined. Types of sewers and drains. Sewer appurtenances Manholes, street inlets, catch basins, sand, grease and oil traps. Maintenance of sewers, problems, in Sewer Maintenances, Sewer Clearing Equipment and Devices.

**UNIT-V** Waste Water Treatment:
**Primary Treatment:** Screening, Grit removal, Grease trap, sedimentation.

*Syllabus – Second Year*

**8. STRUCTURAL DESIGN-I**

**COURSE NO. : BCE 217**
Sessional-25 Paper - 100

**Pds./Week= 03**

**Total Marks = 125**

(b) **Aggregate**: Fine and Coarse aggregates. Sources of aggregates. Classification of aggregates based on Petrography, Size Texture and Mineralogical Compositions. Strength and durability of aggregates. Physical properties of aggregates.


(c) **Water**: Quality of water used in concrete.  


**Special Purpose Concrete**: Introduction to Ready mix Concrete, High Strength, Light weight and Fiber reinforced Concrete. Ferro-cement and its uses.

**Reinforcement**: Type of reinforcement used in RCC work – plain and deformed bars, specification and stress.  

**UNIT-IV**

(a) **Introduction**: Design philosophy, Working Stress and Limit State Design.

(b) Introduction to Limit State Method. Analysis and Design of Singly and doubly reinforced beams – Simply supported and cantilever beams. Assumptions, notation and design equations. Reinforcement details.

(c) Analysis and design of singly and doubly reinforced flanged beams. Reinforcement details.  

**UNIT-V**

(a) **Shear Stress**: Horizontal and Vertical Shear; Diagonal Tension. Shear intensity by (i) Concrete (ii) bent up bars and (iii) Vertical Stirrups. Design of Shear reinforcement with vertical stirrups and bent up bars along with stirrups.

(b) **Development Length**: Intensity of Bond stress. Length of curtailment, overlap of reinforcing bars. Development length equation in Compression and tension.  

*Syllabus – Second Year*
UNIT-1  FASTENERS  20%
Types of fastenings, Screwed fastening, Different types of nuts & bolts. Screws, Keys, Knockle & Coller joints, Riveted joints, welded Joints, Foundation bolts, Studs & Tap bolt, Flange & Flexible shaft couplings.

UNIT-2  TRANSMISSION OF POWER  15%
(A) Belt Drive: Flat belts & V-Belts, Description of open & crossed belt & their uses.
(B) Gear Drive : Types of Gears, Nomenclature, Simple & Compund Gearing.
(C) Clutches & Brakes : Cone & Single Plate Clutches, Shoes Brake (Simple description only )

UNIT-3  HEAT ENGINES  20%
Classification & application of IC Engines, Spark Ignition & Compression Ignition Engines, Working principle of 2-stroke & 4-stroke Petrol & Diesel Engines.

BOILERS
Classification & application of Boilers, Description of simple Vertical Boilers.

UNIT-4  REFRERGATION AND AIR CONDITIONING  20%

UNIT-5  PIPE FLOW EQUIPMENTS  25%
Brief description about Centrifugal, Reciprocating, Submersible & Air lift pumps. Their types & applications, Study of pump characteristics, Cavitations & Multiple pump
operation. Description & application of Piping accessories: Flanges, Couplings, Union Joints, Reducers, Pressure Gauge & Water level indicators.

**EARTH MOVING MACHINES:**

Uses & description of Earth Moving Machine such as Road Rollers, Bulldozers, Power Shovel Dragline, Scraper, Cranes, Hot Mix Plants, Concrete Mixer & Concrete Vibrators.

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**Syllabus – Second Year**

**LAB COURSES**

**1. CONSTRUCTION TECHNOLOGY LAB**

<table>
<thead>
<tr>
<th>COURSE NO: BCE - 281</th>
<th>Pds./Week= 02</th>
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</thead>
<tbody>
<tr>
<td><strong>Sessional</strong> 100</td>
<td><strong>Paper</strong> 50</td>
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<tr>
<td><strong>Total Marks</strong> 125</td>
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</table>

1. Identification and demonstration of building materials & tools used in the construction of building work.
2. Construction of L-junction with model bricks in stretcher & header bonds.
3. Construction of L-junction with one brick thick wall in English and Double Flemish bonds.
4. Construction of L-junction with one & half brick thick wall in English and Double Flemish bonds.
5. Construction of L-junction with two brick thick wall in English and Double Flemish bonds.
8. Demonstration of various mortars, cement concrete mixes.
10. Idea of form work, centering & shuttering and their removal periods for various structural members of R.C.C.
11. Demonstration of various water supply fixtures and sanitary fittings.
12. Site visits.
2. SURVEY LAB II

COURSE NO. : BCE - 282
Sessional- 100 Paper - 50 Total Marks = 125
Pds./Week= 02

1. Levelling by height of instrument and Rise& Fall Method
2. Measurement of horizontal angle
3. Measurement of vertical angle
4. Determination of height of Electric Pole
5. Different cases of Trigonometrical Levelling
6. Determination of sensitiveness & radius of curvature of bubble tube
7. Reciprocal Levelling
8. Determination of Tachometric Constants
9. Determination of Horizontal & vertical Distances by tachometry
10. Different cases of Omitted Measurements
11. Linear Methods of Curve Layout
12. Angular Methods of Curve Layout (One & Two Theodolite Method)
13. Layout of Compound Curve

Camp Work

Extensive Survey Work of One week duration

Syllabus – Second Year

3. HYDRAULICS LAB

Course No. BCE-283 Pds. /Week= 02
Sessional-100 Paper-50 Total Marks -150

1. To verify Bernoulli’s Theorem and to draw the following graphs.
(i) Pressure Head vs. Length of flow pipe.
(ii) Velocity Head vs. Length of flow pipe.
(iii) Total Head vs. Length of flow pipe.

2. To determine coefficient of discharge of the given circular orifice and to draw the following graphs:
   (i) $Q_a$ vs $H$  (ii) $Q_a$ vs $\sqrt{H}$

3. To determine the coefficient of discharge of the given external cylindrical mouthpiece and to draw the following graphs:
   (i) $Q_a$ vs $H$  (ii) $Q_a$ vs $\sqrt{H}$

4. To determine the coefficient of discharge of the given triangular notch and to draw the following graphs.
   (i) $Q_a$ vs $H$  (ii) $Q_a$ vs $H^{5/2}$

5. To determine the loss coefficients of sudden expansion & sudden contraction and to draw the following graphs.
   (i) $\log h_e$ vs $\log (v_1 - v_2)$
   (ii) $h_c$ vs $\sqrt{v_4}$

6. To determine the coefficient of friction of the given pipeline and to draw the following graphs:
   (i) $"h_f"$ vs $"v"$  (ii) $"\log h_f"$ vs $"\log v"$

7. To determine the meter coefficient (coefficient of discharge) of the given venturimeter and to draw the following graphs:
   (i) $Q_a$ vs $H'$  (ii) $Q_a$ vs $\sqrt{H'}$

8. To determine the viscosity of liquids (caster oil & Glycerin) by falling sphere method using Stoke’s law.

*Syllabus – Second Year*

**4. ENVIRONMENTAL ENGINEERING LAB**

Course No. BCE-284  
Pds./Week= 02
1. To collect water samples and wastewater samples for laboratory analysis.
2. To prepare standard solution of the following reagents and calculate their actual
   Normality/ Molarity using primary standards.
4. To determine total and calcium hardness in water samples.
5. To determine total acidity in water and wastewater samples.
6. To determine total phenolphthalein and methyl orange alkalinity in water and
   waste water samples.
7. To determine chloride content in water and waste water samples.
8. To evaluate percentage available chlorine in bleaching powder.
9. To determine dissolved oxygen in water and wastewater samples.
10. To determine Biochemical oxygen demand (BOD) of wastewater samples.
11. To determine Chemical oxygen demand (COD) of wastewater samples.
12. To determine total solids, total dissolved solids (TDS), total suspended solids
   (TSS) and total volatile solids in water and wastewater samples.

5. **COMPUTER APPLICATION LAB**

Course No. BCE-285

Sessional-100 Paper-50 Total Marks -150

I. **MS Word** - Introduction, Paragraph typing & formatting. Preparation of Time Table. Use of Equation Editor.


III. **MS Power Point** - Introduction, Preparation / Making Presentation

*Syllabus – Second Year*

Annexure: I

BOS: 12.5.2006
(From 2007-08)

III Year Diploma in Engineering (Civil)
## Teaching Schedule for III Year Diploma in Engineering (Civil)

### (A) THEORY COURSES

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Course No.</th>
<th>Subjects</th>
<th>Pds/Week</th>
<th>Marks</th>
<th>Total</th>
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<tbody>
<tr>
<td>01.</td>
<td>BCE-311</td>
<td>Structural Design-II</td>
<td>03 - 25 100</td>
<td>125</td>
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<tr>
<td>02.</td>
<td>BCE-312</td>
<td>Theory of Structures</td>
<td>03 - 25 100</td>
<td>125</td>
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<tr>
<td>03.</td>
<td>BCE-313</td>
<td>Irrigation Engineering</td>
<td>02 - 25 100</td>
<td>125</td>
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<tr>
<td>04.</td>
<td>BCE-314</td>
<td>Transportation Engineering</td>
<td>03 - 25 100</td>
<td>125</td>
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<td>05.</td>
<td>BCE-315</td>
<td>Soil Mechanics</td>
<td>02 - 25 100</td>
<td>125</td>
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<tr>
<td>06.</td>
<td>BCE-316</td>
<td>Quantity Survey and Valuation</td>
<td>04 - 75 100</td>
<td>175</td>
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<td>07.</td>
<td>BCE-318</td>
<td>Building Construction and Service</td>
<td>02 - 25 100</td>
<td>125</td>
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<td>08.</td>
<td>BCE-319</td>
<td>Elective (a) Hydraulic Structures (b) Earthquake Engg.</td>
<td>02 - 25 100</td>
<td>125</td>
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<tr>
<td>09.</td>
<td>BCE-320</td>
<td>Environmental Studies</td>
<td>01 10 40 50</td>
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TOTAL: 22 - 260 840 1100

### (B) PRACTICAL COURSES

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<th>S.No.</th>
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<th>Pds/Week</th>
<th>Marks</th>
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<tr>
<td>01.</td>
<td>BCE-381</td>
<td>S. M. &amp; Structure Lab.</td>
<td>- 02 75 50</td>
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<td>02.</td>
<td>BCE-382</td>
<td>Concrete Lab.</td>
<td>- 02 75 50</td>
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<td>03.</td>
<td>BCE-383</td>
<td>Soil Mechanics Lab.</td>
<td>- 02 75 50</td>
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<td>04.</td>
<td>BCE-384</td>
<td>Civil Engg. Drawing &amp; CAD</td>
<td>- 03 100 50</td>
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<td>05.</td>
<td>BCE-385</td>
<td>Survey Lab III</td>
<td>03 75 50</td>
<td>125</td>
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<td>06.</td>
<td>BCE-386</td>
<td>Project and Camp*</td>
<td>- 04 200 50</td>
<td>250</td>
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TOTAL: 16 600 300 900

GRAND TOTAL: 22 16 860 1140 2000

**Note:** *A Project Camp of about One Week duration for detailed survey work pertaining to field problems.*
(A) THEORY COURSE

1. STRUCTURAL DESIGN-II

COURSE NO. : BCE 311  Pds./Week = 03
Sessional-25   Paper - 100  Total Marks = 125

UNIT-I Beams: 20%
Design of rectangular and flanged beams singly and doubly reinforced. Reinforcement Schedule and Sketches.

UNIT-II Slabs: 20%
One-way and two way slab. Design of rectangular, square and circular slabs with corners free and held down. Provision of reinforcement in slabs.

UNIT-III 20%
(a)Columns:
Column and its types. Design of axially loaded column with lateral ties and helical reinforcements.
(b) Footings:
Footings and its types. Footings used for residential buildings. Design of isolated column footings for square, rectangular and circular column footings.

UNIT-IV 20%
(a)Staircase:
Types of staircase. Design of stairs spanning horizontally and doglegged stairs. Reinforcement sketches.
(a) Pre-stressed Concrete:
Assumptions and general principles of design. Pre-tension and post tension system. Analysis of beams with tendons placed at longitudinal centroidal axis and at an
eccentricity, tendons with parabolic profile. Load balancing method. Losses of pre-stress.

UNIT-V  

(a) **Tension Members:**
Common types of tension members. Net sectional area for angles and tees. Design of tension members single and built-up sections.

(b) **Compression Members:**
Common types of Compression Member. Column and Structural Design of Compression members. Single and built-up sections. Design of lacings and battens.

*Syllabus – Third Year*

2. **THEORY OF STRUCTURES**

Course No. : BCE-312  
Periods/week = 03

Sessional – 25  
Paper = 100  
Total Marks= 125

UNIT-I  

(a) **Stresses and Strains**
Introduction - Principle stresses and strains

Graphical methods: Mohr’s circle

Distribution of shear stress in rectangular, circular, I and T section.

(b) **Slope and Deflection**

Computation of slope and deflection for simple cases of cantilever and simply supported beams for concentrated and uniformly distributed load by

(i) Area moment method
(ii) Double integration method and

(iii) Macaulay’s method

UNIT-II  

(a) **Propped Beams**
Prop reactions. Bending moment and shear force diagram for simple loading

(b) **Fixed Beam**
Analysis of fixed beams. SFD and BMD for symmetrical, concentrated and uniformly distributed load.

UNIT-III  

(a) **Torsion**
Torsion of circular shaft, torsional equation. Horse Power transmitted.

(b) **Continuous Beam**
Analysis by Three-moment Theorem Method.
SFD and BMD for symmetrical concentrated and uniformly distributed loads over full span.

**UNIT-IV**

(a) **Combined Direct and Bending Stress**
Stress due to eccentric loads
Law of middle third
Application of Law of middle third for dams.

(b) **Portal Frames**
BM and SF and thrust for portals with static symmetrical loading.

**UNIT-V**

(a) **Three-Hinged Arch**
Linear Arch, Eddy’s theorem, BM, and Normal Thrust for parabolic, circular arch for static loading.

(b) **Influence Lines**
Introduction - ILD for BM and SF for beams. Application of influence line diagram for determination of SF and BM due to concentrated and uniformly distributed load.

*Syllabus – Third Year*

3. **IRRIGATION ENGINEERING**

Course No. : BCE-313

<table>
<thead>
<tr>
<th>Periods/week</th>
<th>Paper</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 03</td>
<td>100</td>
<td>125</td>
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</tbody>
</table>

**UNIT-I** **Introduction:** Definition and scope of the subject.


Water requirements of crops: Crops and Crops seasons, sowing time, harvesting time, command of canal, gross command area, culturable command area, intensity of irrigation, base period, duty, delta, relation between duty and delta, kor period, kor depth, outlet discharge factor, problems.

**UNIT-II** **Methods of irrigation:** Natural, artificial, perennial and non-perennial irrigation, lift and flow irrigation, surface irrigation, sub-surface irrigation and sprinkler irrigation Direct and Indirect Irrigation.

UNIT-III Head works: Selection of the site, types of head works, schematic layout of head works, parts of head works.

Cross drainage works: Necessity, Selection of site, Types of cross drainage works: aqueduct, siphon aqueduct, super passage, siphon, level crossing.

UNIT-IV Dams: Purpose, selection of site, types and typical section of gravity dam, buttress, arch and earthen dams. Causes of failure of gravity dams.

Wells and Tube-wells: Advantages and disadvantages of well irrigation over canal irrigation. Bore and open wells. Types of wells-shallow and deep wells. Strata chart, aquifer, specific yield, cone of depression, types of tube wells, cross-section of tube well, method of boring.

UNIT-V Canal Masonry works: Necessity of fall description of various types of falls. Design of Sharda type on Bligh’s theory

Syllabus – Third Year

4. TRANSPORTATION ENGINEERING

Course No. BCE-314  Periods per week: 03
Sessional = 25  Paper = 100  Total Marks = 125

UNIT-I
Historical Development of Road Construction, Highway Development in India.
Classification of Roads. Highway Geometry: Requisites of a good road, Road Structure, Camber, Super elevation, Road Gradient, Sight Distances.
UNIT-II  

UNIT-III  

UNIT-IV  

UNIT-V  
Types of Railways: Surface Railway, Underground Railway, Elevated Railway. Stations and Yards.


Syllabus – Third Year

5. Soil Mechanics

Course No. BCE-315  
Periods per week: 02
Sessional = 25  
Paper = 100  
Total Marks = 125

UNIT-I: Introduction - Definition of Soil and Soil Mechanics; Soil Formation. Transported and Residual Soils; Soils of India; Importance of Soil Mechanics in Civil Engineering.
Weight Volume Relationship: Constituents of soils. Phase Diagram. Definitions of - void ratio; porosity, degree of saturation, moisture content, specific gravity, unit weight; Density index; Air content.
Derivations of Functional relationships. Atterberg's limits (Liquid, Plastic and Shrinkage limits).
UNIT-II: Classification and Identification of Soil - Particle size and shape and their effect on engineering properties of soil. Field identification test for Coarse-grained and fine-grained soils. I.S.I. Soil Classification System.

Flow of Water Through Soils - Darcy’s Law; Laboratory determination of Permeability of soil. Factors affecting permeability; Average permeability of stratified soil masses. Coefficient of Permeability of different types of soils.


Compressibility and Consolidation: Definition and practical significance of: compression index, coefficient of consolidation, degree of consolidation, normally consolidated soil, pre-consolidated soil, excess pore pressure. Meaning of total settlement and rate of settlement and their importance. Settlement due to construction operations. Effect of settlement on structures and roads

UNIT-IV: Compaction: Definition and concept of: Compaction, Factors affecting compaction, Laboratory Compaction Tests. Definition of O.M.C., Maximum dry density; Moisture-dry density relationship for typical soils with different Compactive efforts. Field Compaction (Equipment and Choice of equipment). Field Compaction Control ⦿ Density Control, Moisture Control, Thickness Control.

Shear Strength - Importance of determination of Shear Strength. Definition of: Cohesion; angle of internal friction; angle of repose. C, Ø and C- Ø soils. Coulomb’s equation. Determine of Shear Strength through: Direct Shear Test, Unconfined Compression Test, And Triaxial Test. Concept of Drainage condition, various drainage conditions.

UNIT-V: Bearing Capacity: Concept of Bearing Capacity; Definition of Ultimate Bearing Capacity; Safe Bearing Capacity allowable Bearing Pressure; Factors affecting Bearing Capacity; Definition of Shallow and Deep Foundations. Introduction of Terzaghi’s Bearing Capacity Equation and Basic Numerical; Field Determination of Bearing Capacity by Plate Load Test and S.P.T.

Instruments: Earth movers ⦿ Trenchers; Inclinometers; Settlement Gauges; Piezometers.

Syllabus – Third Year

BOS: May 2010

6. QUANTITY SURVEY AND VALUATION

<table>
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<th>Course No. BCE-316</th>
<th>Periods per week: 04</th>
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<td>Paper = 100</td>
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UNIT-I General: Definition and Objects of estimating. (15%)

Units of measurements & payments (MKS unit)
Detailed Specifications: Detailed specifications for various items of work as mentioned in UNIT-II & III).

UNIT-II Methods of estimating: (30%)
(i) Long wall and short wall method.
(ii) Centre Line method.

Calculation of the quantities of the following items of work:
(i) Earthwork in excavation in foundation.
(ii) Earthwork in filling in foundation and plinth. Sand filling in plinth.
(iii) Concreting in foundations, floors, roofs etc.
(iv) I-class B/w in foundation, plinth and super-structure.
(v) R.B. and RCC works.
(vi) Wood work and steel work in doors and windows.
(vii) Surface finishing i.e. plastering, pointing, white washing, color washing, distempering and painting.
(viii) RCC/Brickwork in arches.
(ix) Mosaic/stone/Tile flooring.

Detailed Estimates: Preparation of detailed estimates (i.e. abstract/bill of quantities of items of work and abstract of cost) for the following work:
(i) Buildings with continuous wall footings.
(ii) R.C.C. framed buildings/structures.
(iii) Septic tank and soak pit.
(iv) Steel roof truss.
(v) slab culvert
(vi) Bituminous and C.C. roads.

UNIT-III Earth Work: (20%)
E/w calculations for: (i) Roads (ii) Canals (iii) Railway embankments.


Material statements: Material statements for various items of works (as mentioned in UNIT-II & III). (20%)

Valuation: Purpose of valuation. Principles of valuations. Definition of terms such as depreciations, sinking fund, salvage and scrap value. Valuation of building property by replacement cost method and rental return Method of calculation of standard rent, concept of capitalized value and years purchase.

Tender: Tender form, tender documents, tender notice, time limit for tender notice, necessary to include in the tender notice, global tender, sale of tender paper, submission of tender, and deposit of earnest money, opening of tenders, comparative statement of tenders, informal tender, unbalanced tender, example on unbalanced tender. Acceptance of tender, specimen form of letter accepting the tender. Work order contract documents.

Contract: Types of contracts. (15%)

Text Book: Estimating & Costing in Civil Engg. by B. N. Dutta
7. BUILDING CONSTRUCTION AND SERVICES

Course No. : BCE-318  Periods/week = 03
Sessional – 25  Paper = 100  Total = 125

**UNIT-I: FOUNDATIONS:**

(20)

Definition, Classification of Foundation—Shallow and deep foundations, spread strap combined footings and mat or raft foundation. Design of wall footing.

Pile foundation, Pier foundation, well foundation.

Introduction to the mass spring system: free and forced vibrations with and without damping, reciprocating and impact type machine.

**UNIT-II: ARCHITECTURAL DESIGN (OR PLANNING):**

(20)

Orientation and area requirements for various components of a residential building. Functional planning of a Residence. Primary School, a small Hospital (with an emergency O.T. & 6-bed ward) a small Factory.

**UNIT-III: ACCOUSTICS AND SOUND INSULATION:**

(20)

Transmission of sound in rooms, coefficient of sound absorption and noise reduction, classification of acoustical materials, acoustic of palatable building (auditorium, schools, theatre, religious buildings etc.) sound insulation.

**UNIT-IV: SURFACE FINISHING AND CONSTRUCTION**

(20)

**Plastering:** Preparation of surface and application of various types of cement plastering on new/old brick masonry. Requirements of good plastering. Defects in cement plastering and their removal.
**Pointing:** Preparation of surface and application of cement pointing on brick masonry.

**White/Color Washing & Distempering:** Preparation of white/colour washing. Various types of distempers. Preparation of surface, application and defects in distempering.

Brief description (with necessary sketch) of concrete mixer, various types of concrete vibrators and floor grinder.

**UNIT-V:**

**Building Drainage:** Aims of building drainage, different type of sanitary fittings and their applications.

Layout plans of sanitary fittings and building drainage testing of building drainage. Testing of building drainage.

**Building Water supply.** Types of water supply fixtures and their applications. Layout of building water supply arrangement. Arrangement of house connection from supply main.

**Electrification:** Electrification-Plan of a single storied residential building.

**Lighting Conductor:** Brief description with necessary sketches.

**Fire:** Causes, fire resisting materials, fire tests, escape means, fire fighting equipments, Fire Fighting System in a multi-storied building, protection.

**Earthquake:** Cause, Magnitude and Intensity of earthquake. Construction and technique for minimizing the effect of earthquake on high-rise structures.

20%
8. (a) HYDRAULICS STRUCTURES (ELECTIVE)

Course No. : BCE-319 (a)                                             Periods/week = 02
Sessional – 25                                                    Paper = 100          Total = 125


UNIT-V: Various types of cross-drainage works. Hydraulic design of aqueduct and siphon

Aqueduct

1 – Various forces acting on dam
2 – Numerical problems
8. **(b) EARTHQUAKE ENGINEERING**

*Course No.: BCE-319 (b)*  
*Periods/week = 02*  
*Sessional – 25*  
*Paper = 100*  
*Total = 125*

**Unit I**  
**INTRODUCTION:** Continental Drift Theory, Focus, Epicenter, Magnitude. Earthquake recording instrument. Effect of earthquake. Earthquake waves. Shallow focus & Deep focus.

**Unit-II**  
Storey drift. Difference B/W wind & earthquake force. Phenomenon of earthquake, scientific importance of earthquake, lesson learnt from major earthquake, earthquake resistant design of structures.

**Unit-III**  
Major past earthquakes outside & inside India studies and place Indian earthquake, spoke, general consideration, shape of building, wear story & soft story.

**Unit-IV**  
Improving earthquake resistance of low strength masonry building; Guidelines; General principles in construction of earthquake resistance building; Introduction of shear wall, portal frame, space frame, vertical load carrying frame and seismic zones.

**Unit-V**  
Hoop, cross tie, lap splice in beam, anchorage of beam bars in an external joints, beam reinforcement, beam web reinforcement, special, transverse reinforcement in columns. Confining reinforcement in beam, column, footing & column under discontinued walls.

*Syllabus – Third Year*
9. ENVIRONMENTAL STUDIES

Course No. BCE-320 Periods/week=01
Sessional – 10 Paper = 40 Total = 50

Unit-I
Introduction to the environment Objectives of studying environmental studies; definitions of environmental science. Environmental engineering and environmental management; objectives of ecological studies, characteristics of the ecosystem, abiotic and biotic environment its classification, Food chain and food web, flow of energy in the ecosystem.

Unit-II
Types of Pollution
Types of pollutants, classification sources, effects and control Air, Water, Land, Municipal solid Waste; Hazardous Waste; Noise and Odour etc. Role of non-conventional sources of energy for environmental pollution control.

Unit-III
Causes and Impact of Environmental Degradation
Composition of atmosphere, lithosphere, biosphere and hydrosphere, Hydrologic cycle, oxygen cycle, carbon cycle, nitrogen cycle, sulphur cycle. Global warming, Acid rain, ozone depletion, deforestation and desertification.

Unit-IV
Environmental Impact Assessment
Basic concepts of Environmental Impact Assessment (EIA), EIA objectives, different types of EIA, methods and approaches for undertaking EIA, Impact network for Air, Water, Biological, Noise, socio-economic and cultural environment.

Unit-V
Management of Environment and Sustainability
Concept of sustainable development, environment Management System (EMS) ISO 14001, Concept of Waste reduction, recycling and reuse, Environmental Auditing Cleaner Production (CP) and Life Cycle Assessment (LCA).

Syllabus – Third Year

LAB COURSES

1. S. M. & STRUCTURE LAB
Course No. BCE-381

Sessional – 75   Paper = 50   Total = 125

LIST OF EXPERIMENTS

1. Tensile Test
2. Compression Test
3. Hardness Test
4. Impact Value Test
5. Bending Moment
6. Deflection of Beam
   (a) Simply Supported Beam
   (b) Fixed Beam
7. Three Hinge Arches
8. Portal Frame
9. Influence Line Diagrams

Syllabus – Third Year

2. CONCRETE LAB
1. **Tests on Cement**
   (i) Fineness of Cement
   (ii) Normal Consistency
   (iii) Setting Time
   (iv) Tensile Strength
   (v) Compressive Strength
   (vi) Soundness of Cement

2. **Tests on Aggregates**
   (i) Sieve Analysis
   (ii) Fineness Modulus
   (iii) Zonal Classifications

3. **Tests on Fresh Concrete**
   (i) Slump Test
   (ii) Compaction Factor Test
   (iii) Vee Bee Test

4. **Tests on Harden Concrete**
   (i) Compression Test
   (ii) Effect of W/C ratio On the Strength Of concrete
   (iii) Permeability Test

5. **Concrete Mix Design**

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*Syllabus – Third Year*

3. **SOIL MECHANICS LAB**
LIST OF EXPERIMENTS

1. To clarify the given samples of course grained soil.
2. To determine the in site density of soil by care cutter.
3. To determine the specific gravity of the given soil particles, using Pycnometer.
4. To determine the optimum Moisture content (OMC) and maximum dry density of a given soil sample.
5. To determine the liquid limit of a given soil by Casagrende's liquid limit apparatus.
6. To determine the plastic limit of a given soil sample.
7. To determine the shrinkage limit of a given soil sample.
8. To determine coefficient of permeability of a given soil sample at desired density (Constant Head method & falling Head method). Demonstration only.
Course No. BCE-384  Periods/week = 03
Sessional – 100  Paper = 50  Total = 150

Unit I
(i) Working Drawing of residential/ Public building according to local building bye laws (at least Two or three storied)
(ii) Provision of earth quack resistant measures in load bearing building.
(iii) A complete set of submission drawing in development authority.
(iv) Provision of following building services:
   (a) Sanitation
   (b) Water supply
   (c) Air condition
   (d) Fire fighting

Unit II
Structural drawing & detailing of the following:
Single, Double, T-L R inverted T beam, one may & two way slabs, columns & columns footings, stair cases a complete set of segmental drawing for a residential building.

Unit III
(i) Detail drawing of RCC deck Types Bridge.
(ii) Structural steel drawing of the following.
   Section, Columns with lacing & battens, plate girder, lug angle
(iii) Introduction to CAD.

Syllabus – Third Year

5. SURVEYING III
Course No. BCE-385  Periods/week = 02
Sessional – 75  Paper = 50  Total = 125
1. To determine the height of the given object by Tangential Method.
2. To measure the height of the given object (same as in Experiment No 1) using Total Station and compare the results. (Demonstration by the Teacher)
3. To determine the gradient of AB line by Stadia Method.
4. To determine the gradient of AB line by Tangential Method.
5. To determine the gradient of AB line (same as in Experiment No 3 & 4) Using Total Station and compare the results. (Demonstration by the Teacher)
6. To plot the area of the given irregular closed traverse by Latitude & Departure Method using Theodolite and calculate the area of the traverse.
7. To measure the area of the given traverse (same as in Experiment No 6) using Total Station and compare the results. (Demonstration by the Teacher)
8. To determine the omitted portion of a base line.
9. To layout a simple circular curve of radius 50 m & length of long chord as 40 m by the method of perpendicular offsets from long chord. Take ordinate interval as 2 m.
10. Analytical solution of three point problem in Hydrographic Survey.
11. To plot the given area/building/Road by measuring the co-ordinates of the key points using Total Station. (Demonstration by the Teacher)
12. To plot the Contour Lines Using ‘Pythagoras’ software. (Demonstration by the Teacher)

To calculate the volume of earth work/materials for road using ‘Pythagoras’ software. (Demonstration by the Teacher)

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6. **PROJECT AND CAMP**

**Course No. BCE-386**

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<tr>
<th>Sessional</th>
<th>Paper</th>
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<td>200</td>
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<td>250</td>
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</table>

**Periods/week = 02**

**Sessional – 200**

**Paper = 50**

**Total = 250**

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**I**

**Project Problem:** Development of a project document for different type of buildings that includes site visit, planning, design of structural elements, estimation, analysis of rates and structural drawings and detailing etc.

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**II**

**Project camp:** Extensive field work including

(a) Lay out of foundation for buildings
(b) Earth work calculations of road or canals existing at project camp site.

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*Syllabus – Third Year*
PART - II

Diploma in Engineering - Civil
(Construction Technology)
ABSTRACT OF THE SYLLABUS

Annexure: I
BOS: 12.5.2006
(From 2007-08)

Teaching Schedule for I Year Diploma in Engineering - Civil
(Construction Technology)

(A) THEORY COURSE

<table>
<thead>
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<th>Course No.</th>
<th>Subjects</th>
<th>Pds/Week</th>
<th>Marks</th>
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<td>01.</td>
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<td>English &amp; Communication Skills</td>
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<td>Engineering Mathematics-I</td>
<td>03</td>
<td>-</td>
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<td>03.</td>
<td>BMA-112</td>
<td>Engineering Mathematics-II</td>
<td>02</td>
<td>-</td>
<td>25</td>
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<tr>
<td>04.</td>
<td>BPH-111</td>
<td>Engineering Physics</td>
<td>02</td>
<td>-</td>
<td>25</td>
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<td>05.</td>
<td>BCH-111</td>
<td>Engineering Chemistry</td>
<td>02</td>
<td>-</td>
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<td>06.</td>
<td>BME-114</td>
<td>Production Technology</td>
<td>02</td>
<td>-</td>
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<td>07.</td>
<td>BEE-113</td>
<td>Electro Techniques</td>
<td>02</td>
<td>-</td>
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<td>08.</td>
<td>BCE-111</td>
<td>Surveying-I</td>
<td>03</td>
<td>-</td>
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<td>09.</td>
<td>BCE-112</td>
<td>Engineering Drawing</td>
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<td>10.</td>
<td>BCE-113</td>
<td>Construction Materials</td>
<td>03</td>
<td>-</td>
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(B) PRACTICAL COURSES

<table>
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<th>Course No.</th>
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<th>Pds/Week</th>
<th>Marks</th>
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01. BPH-181 Engineering Physics Lab. - 02 75 50 125
02. BCH-181 Engineering Chemistry Lab. - 02 75 50 125
03. BME-183 Workshop Practice - 03 75 50 125
04. BEE-181 Electrical Engineering Lab. - 02 75 50 125
05. BCE-181 Survey Lab. I and Camp* - 03 75+50 50 175

TOTAL: 12 425 250 675
GRAND TOTAL: 27 12 750 1250 2000

Note: * A Survey Camp of about one week duration for extensive fieldwork.

Annexure: I
BOS: 12.05.06

Teaching Schedule for II Year Diploma in Engineering (Civil)
(Construction Technology)

THEORY COURSE

<table>
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<tr>
<th>S.No.</th>
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<th>Pds/Week</th>
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<td>BMA-211</td>
<td>Engg. Mathematics-III</td>
<td>02 -</td>
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<td>02.</td>
<td>BCE-211</td>
<td>Strength of Materials</td>
<td>02 -</td>
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<td>03.</td>
<td>BCE-212</td>
<td>Construction Management**</td>
<td>02 -</td>
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<tr>
<td>04.</td>
<td>BCE-213</td>
<td>Surveying-II</td>
<td>02 -</td>
<td>25</td>
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<td>05.</td>
<td>BCE-214</td>
<td>Civil Engineering Drawing</td>
<td>06 -</td>
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<td>06.</td>
<td>BCE-215</td>
<td>Hydraulics</td>
<td>03 -</td>
<td>25</td>
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<tr>
<td>07.</td>
<td>BCE-216</td>
<td>Environmental Engineering</td>
<td>03 -</td>
<td>25</td>
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<tr>
<td>08.</td>
<td>BCE-217</td>
<td>Structural Design-I</td>
<td>02 -</td>
<td>25</td>
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<tr>
<td>09.</td>
<td>BCT-218</td>
<td>Construction Techniques</td>
<td>02 -</td>
<td>25</td>
</tr>
<tr>
<td>10.</td>
<td>BCT-219</td>
<td>Building Services</td>
<td>02 -</td>
<td>25</td>
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TOTAL: 26 - 325 1000 1325

(B) PRACTICAL COURSES
<table>
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<th>Subjects</th>
<th>Pds/Week</th>
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<tr>
<td>01.</td>
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<td>02.</td>
<td>BCE-282</td>
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<td>GRAND TOTAL</td>
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Note:  
* A Camp of about ten days duration for extensive survey works in hilly region.

** The students must attend at least one Entrepreneur awareness camp (EAC).

*** Compulsory construction site visit and submission of report to be evaluated for 25 marks.

Annexure I  
BOS: 12.5.2006  
(From 2007-08)

Teaching Schedule for III-Year Diploma in Engineering - Civil

(Construction Technology)

(A) THEORY COURSES

<table>
<thead>
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<th>S.No.</th>
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<tr>
<td>01.</td>
<td>BCE-311</td>
<td>Structural Design-II</td>
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<td>02.</td>
<td>BCE-312</td>
<td>Theory of Structures</td>
<td>03</td>
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<td>03.</td>
<td>BCE-313</td>
<td>Irrigation Engineering</td>
<td>02</td>
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<td>BCE-314</td>
<td>Transportation Engineering</td>
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<td>05.</td>
<td>BCE-315</td>
<td>Soil Mechanics</td>
<td>02</td>
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<td>06.</td>
<td>BCE-316</td>
<td>Quantity Survey and Valuation</td>
<td>04</td>
<td>-</td>
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<td>07.</td>
<td>BCT-317</td>
<td>Repair and Maintenance of Civil Works</td>
<td>02</td>
<td>-</td>
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<td>08.</td>
<td>BCT-318</td>
<td>Advance Construction Tech.</td>
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### (B) Practical Courses

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<tr>
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<td>BCE-381</td>
<td>S. M. &amp; Structure Lab.</td>
<td>- 02</td>
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<td>Civil Engg. Drawing &amp; CAD</td>
<td>- 03</td>
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<td>BCE-385</td>
<td>Survey Lab III</td>
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<td>BCE-386</td>
<td>Project and Camp*</td>
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<td>16 885</td>
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Note: *A Project Camp of about One Week duration for detailed survey work pertaining to field problems.

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### II-Year Diploma in Engineering – Civil (Construction Technology)

**CONSTRUCTION TECHNIQUES**

Course No.: BCT-218  
Sessional Marks : 25

Periods/Week: 02  
Examination: 100

**Unit-I**  
Introduction: Definition and classification of building based on occupancy. Selection of site for a residential, commercial, industries and public building. Orientation of building as per IS Code.

Unit-II Masonry: Brick and stone masonry; Technical terms used in masonry work; their types and comparison. Bonds and its types.

Walls: Purpose of walls, classification of walls, load bearing, non load bearing, dwarf, retaining and breast wall etc. Partition walls constructional suitability and uses of brick and wooden partition walls.


Unit-III Floor: Brief description of constructional and pitched roof. Comparison of construction of various types of floors such as brick, stone, cement concrete, mosaic, terrazzo, tiled and timber floors. Flooring on RCC Slab.

Doors and Windows: Types, uses and sketches with sizes of commonly used doors and windows.


Unit-IV Roofs: Flat and pitched roof. Comparison of RB and RCC Roof Various types pitched roof, king post, queen post truss, fink roof and north light truss (only brief description and line sketch), Fixing of asbestos cement (AC), and galvanized iron (G1) sheet of covering over pitched roof.

Surface Drainage: Location and fixing of down water pipes.

Stairs: Construction detail of deferent types of stair case, technical terms, planning and layout of various types of staircases. Geometric design of staircase.

Unit-V Surface Finish: Plastering, Classification according to use and finish Techniques of plastering Curing.

Pointing: Types, mortar used & methods of pointing.

Pointing: Preparation & application of paints on wooden steel and plastered wall surface. White washing, color washing and distempering on new and old walls.

Miscellaneous: General purpose and methods of air conditioning and heat insulation concept of seismic force in planning and design of building and precautions to be observed.
BUILDING SERVICES

Course No.: BCE-219

Sessional Marks: 25

Periods/Week: 02

Examination: 100

Unit-I

Water Supply & Drainage Systems:

Introduction water distribution system General consideration for layout the pipe lines, Technical terms, Estimation of water requirements. Types of pipes, Service connection, size of service pipes, water meter, valves, Storage tanks, water supply Scheme for a house.

Drainage: General principles, pipes and traps, sanitary fitting, systems of plumbing Drainage Scheme for a residential building. Testing of drainage.

Unit-II

Acoustics & Sound Insulation:


Unit-III

Air Conditioning & Ventilation:

Ventilation: Definition & necessity, Requirements of Ventilation System, Systems of Ventilation.

Air Conditioning: Definition, Classification, essentials of Comfort air Conditioning, Systems of Air-Conditioning.

Unit-IV

Electrical Services:

Introduction, Symbols, Types of wiring, General rules for wiring, laying of conduit in slabs, Earthing, Protection of building against lightning, design of distribution board.

Determination of total load, number. of sub-circuits, layout electrical plans for a small house.

Unit-V
Fire Protection:


Syllabus – Second Year

III- Year Diploma in Engineering – Civil (Construction Technology)

REPAIR & MANTAINANCE OF CIVIL WORKS
(Revised Syllabus)

Course No.: BCE-317 Sessional Marks : 25
Periods/Week : 02 Examination : 100


Maintenance Generator: Mechanical, thermal, biological, chemical agents, water, user misuse and vandalism.

Durability of materials: Bricks, Tiles bituminous materials, concrete, metal, plastics, stones & timber.

Unit-II Repair to foundation: Causes of settlement of foundation. Foundation on made up soil. Examination of existing foundation and its strengthening. Anti termite treatment of foundations and floors.

Stones and Bricks Masonry Maintenance: Condition of pointing dampness, efflorescence, growth of vegetation. Structural cracks in masonry: Causes, investigation, remedial measures.

Steel Work Maintenance: Repainting of iron and steel work. Defects of painting.

Road Maintenance: Defects and maintenance in WBM, Bituminous and Concrete road.

Unit-IV Building Maintenance: Inspection of a building; routine building maintenance. Patch repairs for plaster, Leakage through the roofs, Defects of floors and repair. Special repair cases in a building e.g. broken WC, drain and sewer pipe to be replaced, opening to be made in existing wall, cleaning of choked residential sewer line. Replacement of broken WC gully trap. Departmental procedure for repair of building.

Water Supply Distribution: Method to detect leakage. Maintenance of valves, Maintenance of house pipe line and drainage system. Sewer Maintenance.

Unit-V Safety in Maintenance: Safety precaution prior to and during dismantling. Dismantling sequence, dismantling wall, floors. Safety in painting, road maintenance work, sewer line, railway track maintenance.

Repair Restoration and Strengthening of Building subjected to earthquake: Introduction to repair, restoration and strengthening of existing buildings. Repair materials. Techniques to restore original strength: small cracks, large cracks and crushed concrete, Strengthening RC members and foundation.

Syllabus – Third Year

ADVANCE COSTRUCRTION TECHIQUES
(Revised Syllabus)

Course No.: BCE-318 Sessional Marks: 25
Periods/Week: 02 Examination: 100

Unit-I: Construction equipments: Selection of construction equipment, Excavation and transportation equipment, hoisting equipment, conveying and hauling equipment. Soil stabilization and compaction equipments; Mixers; dewatering equipment; Economic life of construction equipment.

Unit-II: Drilling blasting & tunneling equipments:

Explosives: Types, storage, transportation, handling & precautions of explosives, Drilling operation, stemming of bore holes, Detonators, firing the holes.

Tunneling: types, location; alignment and grade of tunnels; dewatering & ventilation of tunnels; rock stabilization.
**Unit-III**: High rise buildings: Construction techniques for high rise building e.g. chimneys & cooling towers. Special problems of high rise constructions. Advantages of high rise buildings.

**VAASTU**: Vastu in construction & its benefits. Vastu for residential & public buildings.

**Rain water harvesting**: Importance & methodology of rain water harvesting.

**Concerting under special conditions**: Placing of concrete in hot and cold weather. Concreting under water. Advantages, preparation & transportation of ready mix concrete.

**Unit-IV**: Prefabrication: Introduction, advantages and disadvantages, Classification and planning requirement in prefabricated construction. Few types of prefabricated elements.

Special foundation: Foundation on reclaimed and expensive soil. Foundation grouting Purpose, material used for grouting; Asphalt & chemical grouting.

Environmental issues in construction: Pollution due to thermal & nuclear power plants. Industrial pollution: Sewage & chemical effluents.

**Unit-V**: Fabrication Processes: Meaning & need of fabrication, welding, casting riveting, threaded joints.

Organization of large structural component: Different departments involved & their welding.

**Fabrication shop organization**: Difference between general drawing & shop drawing, meaning of templates & their importance.

**Erection of steel structures**: meaning & need of erection of steel structures Erecting equipments, methods & precautions.

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**Syllabus – Third Year**

**EARTHQUACK ENGINEERING**

**Course No.: BCT-319**

**Sessional Marks : 25**

**Periods/Week: 02**

**Exam: 100**

Unit-II  Storey drift. Difference B/W wind & earthquake force. Phenomenon of earthquake, scientific importance of earthquake, lesson learnt from major earthquake, earthquake resistant design of structures.

Unit-III  Major past earthquakes outside & inside India studies and place Indian earthquake, spoke, general consideration, shape of building, wear story & soft story.

Unit-IV  Improving earthquake resistance of low strength masonry building; Guide lines; General principles in construction of earthquake resistance building; Introduction of shear wall, portal frame, space frame, vertical load carrying frame and seismic zones.

Unit-V  Hoop, cross tie, lap splice in beam, anchorage of beam bars in an external joints, beam reinforcement, beam web reinforcement, special, transverse reinforcement in columns. Confining reinforcement in beam, column, footing & column under discontinued walls.