RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING
(DIPLOMA CE)

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
RKDF UNIVERSITY RANCHI

Credit System and Marks Distribution:-

Semester-I

SL. No.	Category	SubjectCode	Subject Name	Periods			Credits	Marks Distribution				
				L	T	P		Internal	External		Total	
								Max	Max	Min	Max	Min
1	BSC	DE101	Applied Chemistry	3	0	0	3	30	70	21	100	35
2	BSC	DE102	Mathematics - I	3	0	0	3	30	70	21	100	35
3	Huminities & Social Sc. Courses	DE103	CommunicationSkills in English	2	0	0	2	30	70	21	100	35
4	BSC	DE104	Applied Physics	3	0	0	3	30	70	21	100	35
5	ESC	DE105	Fundamentals of Computer	2	0	0	2	30	70	21	100	35
6	ESC	DE106	Engineering Graphics	2	0	0	2	30	70	21	100	35
PRACTICAL DEMONSTRATION												
1	BSC	DE151	Applied Chemistry Lab	0	0	2	1	30	20		50	25
2	Huminities & Social Sc. Course	DE153	CommunicationSkills in English	0	0	2	1	30	20		50	25
3	BSC	DE154	Applied Physics Lab	0	0	2	1	30	20		50	25
4	ESC	DE155	Fundamentals of Computer Lab	0	0	2	1	30	20		50	25
5	ESC	DE156	Engineering Graphics Lab	0	0	3	1.5	30	20		50	25
6	ESC	DE157	Workshop / Manufacturing Practices Lab	0	0	3	1.5	30	20		50	25
TOTAL							**22**					

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-I
(Common to all Branches)

Branch	Subject Title	Subject Code
CE	Applied Chemistry	DE101

Course Objectives:

1. The students will acquire a foundation in chemistry of sufficient breadth and depth to enable them to understand and critically interpret the primary chemical literature.

2. The students will develop the ability to effectively communicate scientific information and research results in written and oral formats

3. The students will learn professionalism, including the ability to work in teams and apply basic ethical principles.

UNIT 1

Atomic Structure and Chemical Bonding:

Atomic Structure: Definition of atom, Fundamental particles of atom –electron, neutron, protons, Definition of Atomic no, Atomic mass no Isotopes &Isobars,& their distinction with suitable examples, Bohr's and

Rutherford's theory; Definition and Shape of the orbital & distinction between orbits and orbitals, Hund's Rule, filling up the orbital's by Aufbau's principle (till Atomic no. 30) Chemical bonding: Cause of chemical bonding, types of bonds: electrovalent, covalent and coordinate bonds, formation of electrovalent & covalent compounds Eg. $NaCl$, $CaCl_2$, CO_2, Cl_2, NH_3, C_2H_4, N_2, C_2H_2, etc., coordination bond in NH_4^+, and anomalous properties of NH_3, HO_2 due to hydrogen bonding, and metallic bonding, Octet rule, Duplet rule.

UNIT 2

Water and Corrosion:

Water: Characteristics, Sources, Impurities, Hard & Soft Water, Causes of Hardness, Types of Hardness, Degree of Hardness, Boiler and Steam Generation, Scale & Sludge Formation – Causes, Disadvantage, Softening Methods such as Boiling, Clark's, Soda Ash, Lime Soda, Zeolite & Ion Exchange Methods with Principle Chemical Reactions. Plumbo solvency & its

Removal. Numerical Problems. Corrosion: Definition of Corrosion, Types of Corrosion (Dry and Wet chemical Corrosion) and their mechanism. Protection of metal from corrosion (Corrosion Control). Application of Protective Coatings like metal coating such as Galvanizing, Tinning, Metal Spraying, Sherardizing, Electroplating and Metal Cladding.

UNIT 3

Electrochemistry and Electrochemical Cells:

Electrochemistry: Definition of terms: Conductors, Insulators, Dielectrics, Electrolyte, Non-Electrolyte, Electrolysis, Electrolytic Cell with suitable examples, Electrolytic dissociation, Arrhenius Theory of Ionization, Degree of Ionization & factors affecting degree of ionization. Redox reactions. Faradays laws of electrolysis and simple numerical problems. Electrochemical cells: Concept of electrode potential such as reduction potential & oxidation potential. Electrochemical Series, Electrolysis of $CuSO_4$ Solution by using Cu Electrode & Platinum Electrode, Electrochemical Cells & Batteries, Definition, types such as Primary & Secondary Cells & their examples.

UNIT 4

Lubricants and Fuels:

Lubricants: Definition, Classification with examples. Functions of lubricant, Lubrication - Mechanism of Lubrication (Fluid Film, Boundary and Extreme Pressure). Physical Characteristics of Lubricants Such as Viscosity, Viscosity Index, Oiliness, Volatility, Flash & Fire Point, and Cloud & Pour Point, Chemical Characteristics such as Acid Value or Neutralization Number, Emulsification, Saponification Value, Selection of Lubricants, Characteristics of Transformer oil Fuels: Definition and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula. Proximate analysis of coal solid fuel petrol and diesel - fuel rating (octane and cetane numbers), Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.

UNIT 5

Metals and Non - Metallic Materials:

Metals: Occurrence of Metal such as Iron, Aluminum, Chromium, Nickel, Tin, their properties Definition of Metallurgy Mineral, Ore Gangue Flux & Slag, stages of Extraction of

metal from Its Ores in detail. Alloys: definition of alloy, purposes of making alloy. preparation methods, General Principal of metallurgy, minerals/ ores, ore dressing, roasting, smelting, bessemerization, fluxes, purification. Explanation of alloying purposes, methods of preparation, composition and uses of alloy like brass, bronze, duralumin, German silver, gun metal, solder, stainless steel, casting and bearing alloy. Nonmetallic materials: Definition of Polymers, formation of Polymers by Addition & condensation polymerization. Properties and uses of PVC, polyethene, polystyrene, polyamides, polyesters, Bakelite. Synthetic fibers – nylon, rayon, decron, and polyesters. Natural Rubber rubber its processing and drawbacks, vulcanization of rubber with chemical reaction, synthetic rubber, definition & distinction between natural &synthetic rubber Thermal insulating material : definition & characteristics of thermal insulator. Preparation, properties & application of thermocol & glass wool Properties & application of Asbestos cork

Text Books:

1. Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18. TEXT

Reference Books

1. Engineering Chemistry Jain & Jain, Dhanpat Rai and Sons**;** New Delhi, 2015
2. Engineering Chemistry S. S. Dara & Dr.S.S.Umare, S. Chand Publication; New Delhi, 2015.
3. Industrial Chemistry B. K. Sharma, Goel Publication
4. Engineering Chemistry By O P Agarwal (Khanna Publication)
5. Environmental Chemistry & Pollution Control S. S. Dara, S. Chand Publication
6. Chemistry for Engineers Agnihotri, Rajesh, Wiley India Pvt. Ltd., 2014.
7. Engineering Chemistry Rao and Agarwal
8. Engineering Chemistry P.C. Jain
9. Applied Chemistry H.N. Sahni
10. Polytechnic Chemistry Vedprakash Mehta, Jain brothers
11. Engineering Chemistry Uppal

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Course Outcomes:

1. Students will be able to do when they successful complete a learning experiences whether it isproject, course or program

Typically, we divide their course into smaller units such. Modules, mapwork, flowchart etc.

As a, general rules applied, as the level of analysis becomes smaller, from coures to module toassignment. Students will be able to function as a member of an interdisciplinary problems solving team. Students will be appreciate the central role of chemistry in our society and we use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemical, environmental issues and key issues facing our society in energy health and medicine.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-I

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	Applied Chemistry Lab	DE151

List of Experiments:

1. Determination of Total hardness by EDTA method.
2. Determination of Total hardness by Clarke's method.
3. Determination of Flash & Fire Points by Pensky Marten Apparatus.
4. Determination of Flash & Fire Points by by Abel's Apparatus.
5. Determination of Viscosity and Viscosity index by Redwood viscometer No.1.
6. Determination of Viscosity and Viscosity index by Redwood viscometer No.2.
7. Determination of percentage of Copper in Brass by Iodometric Titration.
8. To prepare a solution of N/20 sodium carbonates and find the strength of HCl using N/20 sodium carbonate solution.

Books/ Reference:-

1. Applied Chemistry Laboratory Practices Vol. I and Vol. II, Dr. G. H. Hugar & Prof A. N. Pathak, NITTTR, Chandigarh, Publications, 2013-14. LAB

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Diploma Engineering Semester-I

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	**Mathematics-I**	**DE102**

Course Objectives:- To provide the students with sufficient knowledge in Trigonometry, differential calculus, complex number partial fractions and binomial theorem, this can be used in their respective fields.

UNIT-I

Trigonometry: Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of sin x, cos x, tan x and e^x

UNIT – II

Differential Calculus: Definition of function; Concept of limits. Four standard limits:

Differentiation by definition of sinx and cosx, tan x, logax Differentiation of sum, product and quotient of functions. Differentiation of function of a function. Differentiation of trigonometric a inverse trigonometric functions, Logarithmic differentiation, Exponential functions.

UNIT-III

Algebra: Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian, representation of a complex number and its conversion from one form to other, conjugate of a complex number, modulus and amplitude of a complex number Addition, Subtraction, Multiplication and Division of a complex number. De-Movier's Theorem, its application.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT – IV

Partial fractions: Definition of polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non- repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors. To resolve improper fraction into partial fraction

UNIT – V

Permutations and Combinations: Value of nPr and nCr

Binomial theorem: Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problem.

Books /References:

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

2. G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.

3. Reena Garg, Engineering Mathematics, Khanna Publishing House, New Delhi (Revised Ed. 2018)

4. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Engineering Mathematics, 6/e., Vikas Publishing House.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-I

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	Communication skills in English	DE103

COURSE OBJECTIVES:

1. Ability to be comfortable with English in use while reading or listening.
2. Ability to use receptive skills through reading and listening to acquire good exposure to language and literature.
3. Ability to write and speak good English in all situations.
4. Students should develop style in speech and writing and manipulate the tools of language for effective communication.

UNIT -1

Application of Grammar, Verbs Tense. Do as directed (active/passive, Direct/ Indirect, affirmative/ Negative/ Assertive/ Interrogative, Question tag, remove too, use of article, preposition, conjunction, punctuation). Correct the errors from the sentences. Vocabulary Building (Synonyms/ Antonyms/ Homophones/ Use of contextual word in given paragraph)

UNIT-2

Introduction to communication Definition, Communication cycle Concept of Communication Process Formal Communication Formal: Types- a) Vertical Communication b) Horizontal Communication Informal: Types- Diagonal Communication Verbal Vs Non-Verbal Communication.

Verbal: Types a) Oral Communication b) Written Communication Non-Verbal: Types a) Body Language b) Graphic Language

UNIT-3

Principal of Effective Communication. Principal of Effective Communication, Communication barriers and how to overcome them.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT-4

Developing Effective message: Thinking about purpose, knowing the audience, structuring the message, selecting proper channels, minimize barriers and facilitating feedback. (Example: Writing articles for newspapers, magazines)

Books/ References:

1. Contemporary English Grammar Structures and Composition; David Green, Macmillan

2. English Grammar and composition; R. C. Jain, Macmillan

3. Effective Technical Communication; M. Ashraf Rizvi, Tata McGraw Hill Companies

4. Developing communication Skills; Krushna Mohan, Meera Baneji, Macmillan.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Diploma Engineering Semester-I

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	Applied physics-I	DE104

Course Objectives:- study of applied physics aims to give an understanding of physical world by observation and predictions. The course help diploma engineers to apply the basic concepts and principles to solve engineering problems and to understand different technology-based application.

Unit -1

Physical world, Units and Measurements: Physical quantities; fundamental and derived, Units and systems of units (FPS, CGS and SI units), Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimensions, Dimensional equations and their applications (conversion from one system of units to other, checking of dimensional equations and derivation of simple equations), Limitations of dimensional analysis. Measurements: Need, measuring instruments, least count, types of measurement (direct, indirect), Errors in measurements (systematic and random), absolute error, relative error, error propagation, error estimation and significant figures.

Unit-2

Force and Motion: Scalar and Vector quantities – examples, representation of vector, types of vectors. Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only), Scalar and Vector Product, Resolution of a Vector and its application to inclined plane and lawn roller. Force, Momentum, Statement and derivation of conservation of linear momentum, its applications such as recoil of gun, rockets, Impulse and its applications. Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period, Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical), Centripetal and Centrifugal forces with live examples, Expression and applications such as banking of roads and bending of cyclist.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit-3

Work, Power and Energy: Work Concept and units, examples of zero work, positive work and negative work Friction: concept, types, laws of limiting friction, coefficient of friction, reducing friction and its engineering applications, Work done in moving an object on horizontal and inclined plane for rough and plane surfaces and related applications. Energy and its units, kinetic energy, gravitational potential energy with examples and derivations, mechanical energy, conservation of mechanical energy for freely falling bodies, transformation of energy (examples). Power and its units, power and work relationship, calculation of power (numerical problems)

Unit-4

Rotational Motion: Translational and rotational motions with examples, Definition of torque and angular momentum and their examples, Conservation of angular momentum (quantitative) and its applications. Moment of inertia and its physical significance, radius of gyration for rigid body, theorems of parallel and perpendicular axes (statements only), Moment of inertia of rod, disc, ring and sphere (hollow and solid); (Formulae only).

Unit-5

Properties of Matter: Elasticity: definition of stress and strain, moduli of elasticity, Hooke's law, significance of stress-strain curve. Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications. Surface tension: concept, units, cohesive and adhesive forces, angle of contact, Ascent Formula (No derivation), applications of surface tension, effect of temperature and impurity on surface tension. Viscosity and coefficient of viscosity: Terminal velocity, Stoke's law and effect of temperature on viscosity, application in hydraulic systems. Hydrodynamics: Fluid motion, stream line and turbulent flow, Reynold's number Equation of Continuity, Bernoulli's Theorem (only formula and numerical) and its applications.

Unit-6

Heat and Thermometry: Concept of heat and temperature, modes of heat transfer (conduction, convection and radiation with examples), specific heats, scales of temperature and their relationship, Types of Thermometers (Mercury thermometer, Bimetallic

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

thermometer, Platinum resistance thermometer, Pyrometer) and their uses. Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them, Co-efficient of thermal conductivity, engineering applications.

Text Books:

1.   Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi

Reference Books:

1. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi.
2. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
3. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
4. Engineering Physics by DK Bhattacharya & Poonam Tandan; Oxford University Press, New Delhi

Course Outcomes:- After undergoing this subject, the students will be able to-

1. Identify physical quantity, select their units for engineering solutions and make measurement with accuracy.
2. Describe the different forms of energy, methods of transfer of energy.
3. Represent the physical quantity as scalar and vectors to solve real life relevant problems.
4. Analyze the type of motion and apply the formulation to understand banking pf road and conservation of momentum, recoil of gun etc.
5. Describe the concept of work, energy and power with their units and derive the relationship for work energy and power.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-I

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	Applied Physics-I Lab	DE154

Course objectives-

The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help student to apply the basic concepts in solving engineering and technology-based problems. In addition, students geta confidence in handling equal and thus learn skill of measurements.

List of Practical:

1) To measure the length, radius of a given cylinder, a test tube using vernier caliper and find the volume of each object.

2) To determine the diameter of a wire, a solid ball using screw gauge. 3) To Verify the Ohm's law

4) To verify the Kirchhoff's law (kvl ans kcl)

5) To find the surface tension of a liquid by capillary rise method.

6) To determine the viscosity of a given liquid (Glycerin) by Stoke's law.

7) To verify the law of conservation of mechanical energy.

8) To measure the room temperature of hot bath using mercury Thermometer and convert it into different scale.

9) To determine the radius of curvature of concave and convex mirror using spherometer.

10) Determine the force constant using Hook's law.

Course Outcomes: After undergoing this lab work, students will be able to -

1. Select the right kind of measuring tools (meter scale, screw gauge, vernier calipers etc)

2. Describe and verify the Hook's law and determine the force constant of a spring body.

3. Understand the Stoke's law and determine the viscosity of a given liquid.

4. Understand the use of thermometer to measure the temperature under different conditions and scales.

5. Understand the current and voltage relationship.

Books/References:-

1. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi.

2. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi

3. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi

4. Engineering Physics by DK Bhhatacharya & Poonam Tandan; Oxford University Press, New Delhi

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-I

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	Fundamentals of Computer	DE105

Unit- 1

Basic Internet skills: Understanding browser, efficient use of search engines, awareness about Digital Indie portals (state and national portals) and college portals. General understanding of various coin puter hard ware Com ponents — CPU, Memory, Display, Keyboard, Mouse, HDD and other Peripheral Devices.

Unit- 2

OS installation (Linux and MS Windows), Unix Shell and Commands, vi editor.

Unit- 3

HTML4, CSS, making basic personal webpage

Unit- 4

Office Tools: Open Office Writer, Open Office Spreadsheet (Calc), Open Office Impress.

Unit-5

Information security best practices. Class lectures will only introduce the topic or demonstrate tool, actual learning will take place in the Lab by practicing

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Diploma Engineering Semester-I

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	Engineering Graphics	DE106

Course Objectives:- To understand techniques of drawings in various fields of engineering

UNIT – I

Basic elements of Drawing: Drawing Instruments and supporting materials: method to use them with applications. Convention of lines and their applications. Representative Fractions – reduced, enlarged and fullsize scales; Engineering Scales such as plain and diagonal scale. Dimensioning techniques as per SP-46:2003 – types and applications of chain, parallel and coordinate dimensioning. Geometrical and Tangency constructions. (Redraw the figure)

UNIT – II

Orthographic projections: Introduction of projections-orthographic, perspective, isometric and oblique: concept and applications. (No question to be asked in examination). Introduction to orthographic projection, First angle and Third angle method, their symbols. Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. (use First Angle Projection method only)

UNIT – III

Isometric Projections: Introduction to isometric projections. Isometric scale and Natural scale. Isometric view and isometric projection. Illustrative problems related to objects containing lines, circles and arcs shape only. Conversion of orthographic views into isometric view/projection.

UNIT – IV

Free Hand Sketches of engineering elements: Free hand sketches of machine elements: Thread profiles, nuts, bolts, studs, set screws, washer, Locking arrangements. (For branches other than mechanical Engineering, the teacher should select branch specific elements for free hand sketching) Free hand sketches of orthographic view (on squared graph paper) and isometric view (on isometric grid paper)

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT – V

Computer aided drafting interface: Computer Aided Drafting: concept. Hardware and various CAD software available. System requirements and understanding the interface. Components of AutoCAD software window: Title bar, standard tool bar, menu bar, object properties tool bar, draw tool bar, modify tool bar, cursor cross hair. Command window, status bar, drawing area, UCS icon. File features: new file, Saving the file, opening an existing drawing file, Creating templates, Quit. Setting up new drawing: Units, Limits, Grid, Snap. Undoing and redoing action.

Unit – VI

Computer aided drafting: Draw basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, Poly Line. Method of Specifying points: Absolute coordinates, Relative Cartesian and Polar coordinates. Modify and edit commands like trim, extend, delete, copy, offset, array, block, layers. Dimensioning: Linear, Horizontal Vertical, Aligned, Rotated, Baseline, Continuous, Diameter, Radius, Angular Dimensions. Dim scale variable.

Editing dimensions. Text: Single line Text, Multiline text. Standard sizes of sheet. Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, printpreview.

Books /Reference:

1. N. D.Bhatt, *Engineering Drawing*, Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93- 80358-17-8

2. R. K. Dhawan, *Engineering Drawing*. S. Chand and Company, New Delhi; ISBN: 81-219-1431- 0.

Course Outcomes :-

1. To know about different types of lines & use of different types of pencils in an engg. Drawing
2. To know how to represents letters & numbers in drawing sheet
3. To know about different types of projection
4. To know projection of points ,straight lines, solids etc.
5. To know development of different types of surfaces.
6. To know about isometric projection

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-I

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	**Workshop/Manufacturing Practices Lab**	**DE157**

Details of Practical Content:

1. Carpentry:

(i) Demonstration of different wood working tools / machines.

(ii) Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc.

(iii) One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.

2. Fitting:

(i) Demonstration of different fitting tools and drilling machines and power tools

(ii) Demonstration of different operations like chipping, filing, drilling, tapping, sawing, cutting etc.

(iii) One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.

3. Welding:

(i) Demonstration of different welding tools / machines.

(ii) Demonstration on Arc Welding, Gas Welding, MIG, MAG welding, gas cutting and rebuilding of broken parts with welding.

(iii) One simple job involving butt and lap joint.

4. Sheet Metal Working:

(i) Demonstration of different sheet metal tools / machines.

(ii) Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing, soldering, brazing, and riveting.

(iii) One simple job involving sheet metal operations and soldering and riveting.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

5. Electrical House Wiring:

(i) Practice on simple lamp circuits

(ii) One lamp controlled by one switch by surface conduit wiring,

(iii) Lamp circuits- connection of lamp and socket by separate switches,

(iv) Connection of Fluorescent lamp/tube light,

(v) simple lamp circuits-install bedroom lighting.

(vi) Simple lamp circuits- install stair case wiring.

6. Demonstration:

(i) Demonstration of measurement of Current, Voltage, Power and Energy.

(ii) Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories.

(iii) Tools for Cutting and drilling

Books/References:

1. S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015

2. B.S. Raghuwanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi 2014

3. K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Credit System and Marks Distribution:-

Semester-II

SL. No.	Category	Subject Code	Subject Name	L	T	P	Credits	Internal Max	External Max	External Min	Total Max	Total Min
1	BSC	DE201	Mathematics – II	3	0	0	3	30	70	21	100	35
2	BSC	DE202	Applied Physics – II	3	0	0	3	30	70	21	100	35
3	ESC	DE203	Fundamentals of Electrical & Electronics Engineering	2	0	0	2	30	70	21	100	35
4	ESC	DE204	Engineering Mechanics	2	0	0	2	30	70	21	100	35
5	Huminities & Social Sc. Course	DE205	Communication Skills in English-II	3	0	0	3	30	70	21	100	35
PRACTICAL DEMONSTRATION												
1	BSC	DE252	Applied Physics –II Lab	0	0	2	1				50	25
2	ESC	DE253	Fundamentals of Electrical &Electronics Engineering Lab	0	0	2	1				50	25
3	ESC	DE254	Engineering Mechanics Lab	0	0	2	1				50	25
TOTAL							**16**					

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-II

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	Applied Physics-II	DE202

Course Objectives:

Applied physics aims to gives an understanding of this world both by observation and prediction of the way in which the object behaves; This course helps the student to solve board-based engineering problems.

Unit – 1

Wave motion and its applications:

Wave motion, transverse and longitudinal waves with examples, definitions of wave velocity, frequency and wave length and their relationship, Sound and light waves and their properties, Wave equation, Amplitude, Phase, Phase difference, principle of superposition of waves and beat formation. Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency etc. Simple harmonic progressive wave and energy transfer, study of vibration of cantilever and determination of its time period, Free, forced and resonant vibrations with examples.

Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications, Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.

Unit – 2

Optics: Basic optical laws; reflection and refraction, refractive index, Images and image formation by mirrors, lens and thin lenses, lens formula, power of lens, magnification and defects. Total internal reflection, Critical angle and conditions for total internal reflection, applications of total internal reflection in optical fiber. Optical Instruments; simple and compound microscope, astronomical telescope in normal adjustment, magnifying power, resolving power, uses of microscope and telescope, optical projection systems.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit – 3

Electrostatics: Coulombs law, unit of charge, Electric field, Electric lines of force and their properties, Electric flux, Electric potential and potential difference, Gauss law: Application of Gauss law to find electric field intensity of straight charged conductor, plane charged sheet and charged sphere. Capacitor and its working, Types of capacitors, Capacitance and its units. Capacitance of a parallel plate capacitor, Series and parallel combination of capacitors (related numerical), dielectric and its effect on capacitance, dielectric break down.

Unit – 4

Current Electricity: Electric Current and its units, Direct and alternating current, Resistance and its units, Specific resistance, Conductance, Specific conductance, Series and parallel combination of resistances. Factors affecting resistance of a wire, carbon resistances and colour coding. Ohm's law and its verification, Kirchhoff's laws, Wheatstone bridge and its applications (slide wire bridge only), Concept of terminal potential difference and Electro motive force (EMF) Heating effect of current, Electric power, Electric energy and its units (related numerical problems), Advantages of Electric Energy over other forms of energy.

Unit – 5

Electromagnetism: Types of magnetic materials; dia, para and ferromagnetic with their properties, Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and units, magnetization. Concept of electromagnetic induction, Faraday's Laws, Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor, force on rectangular coil placed in magnetic field. Moving coil galvanometer; principle, construction and working, Conversion of a galvanometer into ammeter and voltmeter.

Semiconductor Physics: Energy bands in solids, Types of materials (insulator, semi-conductor, conductor), intrinsic and extrinsic semiconductors, p-n junction, junction diode and V-I characteristics, types of junction diodes. Diode as rectifier – half wave and full wave rectifier (centre taped). Transistor; description and three terminals, Types- pnp and npn, some electronic applications (list only). Photocells, Solar cells; working principle and engineering applications.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Text Books:

Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi

Reference Books:

Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi

Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi

Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi

Course Outcomes:- After undergoing through syllabus, the students will be able to:

1. Explain the wave motion, simple harmonic motion, polarization of wave etc.
2. Explain the ultrasonic waves and engineering, medical and industrial application of ultra sound.
3. Apply the knowledge of diodes, led, power adapters in electronic circuit.
4. Explain the current as flow of charge, concept power and resistance. Etc.
5. Express the nano science and technique and their effects on nanosecond and science and their impact on society. Etc.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-II
(Common to all Branches)

Branch	Subject Title	Subject Code
CE	**Fundamental of Electrical & Electronics Engineering**	**DE203**

Course Objectives:-

1. To familiarize students with basic electrical and electronic components and their functions
2. To make the students aware with AC and DC circuits and their analysis.

Unit-I

Overview of Electronic Components & Signals: Passive Active Components: Resistances, Capacitors, Inductors, Signals: DC/AC, voltage/current, periodic/non-periodic signals, average, rms, peak values, different types of signal waveforms, Ideal/non-ideal voltage/current sources, independent/dependent voltage current sources.

Unit- II

Diodes, Transistors, FET, MOS and CMOS and their Applications, Overview of Digital Electronics: Introduction to Boolean Algebra, Electronic Implementation of Boolean Operations, OP AMP 741

Unit- III

Electric and Magnetic Circuits: EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis loop, reluctance, leakage factor and BH curve; Electromagnetic induction, Faraday's laws of electromagnetic induction, Lenz's law

Unit-IV

A.C. Circuits: Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; Mathematical and phasor representation of alternating emf and current; Voltage and Current relationship in Star and Delta connections; A.C in resistors, inductors and capacitors; A.C in R-L series, R-C series, R-L-C series and parallel circuits; Power in A. C. Circuits, power triangle, Introduction Overview and applications of Electrical Machines DC Motor, DC Generator, AC Generator, Induction Motor and Transformer

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

.**Text Books:**

1. Basic Electrical Engineering I.J. Nagrath and D.P. Kothari, 2nd Edition, TMH, Delhi.

2. Basic Electrical Engineering by UA Bakshi and AV Bakshi Technical Publications Pune.

Books/References:

1. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House

2. Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN:978-0-07-0088572-5

3. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN: 9781107464353

Course Outcomes:

1. After completing the course students will be able to

2. Discuss about basic electrical and electronic devices

3. Solve network problems of AC and DC circuits

4. Can design basic analog and digital circuits.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-II

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	**Fundamental of Electrical & Electronics Engineering Lab**	**DE253**

Course Objectives:-

1. To make the students able to do design and make connection for basic electrical circuit.

2. To enable students to verify the characteristics of the electrical and electronic circuits practically

3. To have sound practice of electrical safety.

List of Experiments

1. To study the various components of Electrical and Electronics.

2. To determine the stated value of a resistor by interpreting the color code indicated on the resistor.

3. To measure resistance using ohmmeter

4. To study and verify the series and parallel Circuit.

5. To study and plot V-I Characteristics of Silicon P-N Junction Diode.

6. To study the dependence of current on the potential difference across a resistor and determine its resistance. Also plot a graph between V and I.

7. To study the Inverting Amplifier and Non-Inverting Amplifier op-amp circuits.

8. To study the basic logic gates: AND, OR, NOT

9. To Study the Characteristics of Half – Wave Rectifier.

10. To study the Characteristics of Light Emitting Diode

Course Outcomes:

1. Students will be able to analyze and design electrical and electronic circuits practically.

1. Students will be able to study the characteristics of basic electrical circuits.

2. Students will be able to follow electrical safety in all prospects.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-II
(Common to all Branches)

Branch	Subject Title	Subject Code
CE	Engineering Mechanics	DE204

COURSE OBJECTIVES;-

To enable students to understand relationship of physical processes, kinetics and kinematics.

To develop skills to use the basic principles of mechanics in engineering applications.

Unit -I

Basics of mechanics and force system: Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units. Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification. Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem. Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces.

Unit– II

Equilibrium: Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analyzing equilibrium Lami's Theorem – statement and explanation, Application for various engineering problems. Types of beams, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple), Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and uniformly distributed load. Beam reaction graphically for simply supported beam subjected to vertical point loads only.

Unit– III

Friction: Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-efficient of friction and angle of friction. Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.

Unit– IV

Centroid and center of gravity: Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle) Centroid of composite figures composed of not more than three geometrical figures Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere) Centre of Gravity of composite solids composed of not more than two simple solids.

Unit – V

Simple lifting machine: Simple lifting machine, load, effort, mechanical advantage, applications and advantages. Velocity ratio, efficiency of machines, law of machine. Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non- reversible machines, conditions for reversibility Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel,

Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block.

Books/Reference:-

1. D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi (2008)
2. Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.

Course Outcomes:-

1. Students will understand the concepts of engineering mechanics
2. Students will understand the vectorial representation of forces and moments
3. Students will gain knowledge regarding center of gravity and moment of inertia and apply them for practical problems.
4. Students will gain knowledge regarding various types of forces and reactions and tom draw free body diagram to quicker solutions for complicated problems.
5. Student will gain knowledge in solving problems involving work and energy CO6 Student will gain knowledge on friction on equilibrium and its application.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering Semester-II

(Common to all Branches)

Branch	Subject Title	Subject Code
CE	**Communication Skills-2**	**DE205**

Course Objectives:- To understand the different aspects of communication using the four macro skills – LSRW (Listening, Speaking, Reading, Writing)

UNIT -1

Formal written skills Office Drafting: Circular, Notice and Memo Job Application with resume. Business correspondence: Enquiry, Order letter, Complaint letter and Adjustment letter.

Report writing: Accident report, fall in production, Progress report, Investigation report.

UNIT -2

Principles of Effective Communication Principles of Effective listening/Speaking Communication Barriers

Overcoming Barrier

UNIT -3

Soft skill development

Speaking skill

Introduction to Group discussion Process of Group Discussion Leadership skill

Instant public speaking

UNIT -4

Etiquettes and Body Language

Telephone etiquettes listening/Speaking Problems of telephonic conversation Verbal /oral etiquettes

Physical appearance

Eye contact/ Body Language Group Discussion

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Books/References:

1. Contemporary English Grammar Structures and Composition; David Green, Macmillan

2. English Grammar and composition; R. C. Jain, Macmillan

3. Effective Technical Communication; M. Ashraf Rizvi, Tata McGraw Hill Companies

4. Developing Communication Skills; Krushna Mohan, Meera Baneji, Macmillan

   Course Outcomes :- The students should be able to : Apply Verbal and Non-Verbal Communication Techniques in the Professional Environment.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Credit System and Marks Distribution:-

SL. No.	Category	Subject Code	Subject Name	L	T	P	Credits	Internal Max	External Max	External Min	Total Max	Total Min
			Semester-III									
1	BSC	DE301	Mathematics – III	3	0	0	3	30	70	21	100	35
2	PCC	DCEP302	Surveying	3	0	0	3	30	70	21	100	35
3	PCC	DCEP303	Mechanics of Materials	2	1	0	3	30	70	21	100	35
4	PCC	DCEP304	Building Construction and Construction Materials	4	0	0	4	30	70	21	100	35
5	PCC	DCEP305	Geotechnical Engineering	2	1	0	3	30	70	21	100	35
			PRACTICAL DEMONSTRATION									
1	PCC	DCEP352	Surveying Lab	0	0	2	1				50	25
2	PCC	DCEP353	Mechanics of Materials	0	0	2	1				50	25
3	PCC	DCEP354	Geotechnical Engineering	0	0	2	1				50	25
6	IN		Summer Internship (4 weeks) after 2nd sem	0	0	4	2				50	25
			TOTAL				**21**					

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – III

Branch	Subject Title	Subject Code
CE	**Building Construction and Construction Materials**	**DCEP304**

Course Objective:

1. To identify different components of building.

2. To understand different types of foundation and their significance.

3. To know different types of masonry and their construction.

UNIT -1

Overview of Building Components

Classification of Buildings as per National Building Code Group A to I, as per Types of Constructions- Load Bearing Structure, Framed Structure, Composite Structure.

Building Components - Functions of Building Components, Foundation, Plinth and Super structure.

UNIT -2

Natural And Artificial Construction Materials

Requirements of good building stone; general characteristics of stone; quarrying and dressing methods and tools for stone.

Structure of timber, general properties and uses of good timber, different methods of seasoning for preservation of timber, defects in timber.

Asphalt, bitumen and tar used in construction, properties and uses.Properties of sand and uses.

Classification of coarse aggregate according to size.Constituents of brick earth, Conventional/ Traditional bricks, Modular and Standard bricks, Special bricks –fly ash bricks, Characteristics of good brick

UNIT -3

Special and Processed Construction Materials

Types of material and suitability in construction works of following materials**:** Water proofing, Termite proofing; Thermal and sound insulating materials., Paints**-** whitewash, cement paint, Distempers, Oil Paints and Varnishes

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT -4

Construction of Substructure and Superstructure

Job Layout: Site Clearance, Layout for Load Bearing Structure and Framed Structure by Center Line and Face Line Method, Precautions.

Foundation: Functions of foundation, Types of foundation – Shallow Foundation, Stepped Footing, Wall Footing, Column Footing, Isolated and Combined Column Footing, Raft Foundation. **Stone Masonry:** Terms used in stone masonry- facing, backing, hearting, through stone, corner stone, cornice. Types of stone masonry: Rubble masonry, Ashlar Masonry and their types. 4.4. **Brick masonry:** Terms used in brick masonry, header, stretcher, closer, quoins, course, face, back, hearting, bat bond, joints, lap, frog. Bonds in brick masonry header bond, stretcher bond, English bond and Flemish bond.

Scaffolding and Shoring: Purpose, Types of Scaffolding, Process of Erection and Dismantling. Purpose and Types of Shoring, Underpinning

UNIT -5

Building Communication and Ventilation

Doors –Components of Doors, Full Paneled Doors, Partly Paneled and Glazed Doors, Flush Doors, Collapsible Doors, Rolling Shutters, Revolving Doors, Glazed Doors. Sizes of Door recommended by BIS.

Windows: Component of windows, Types of Windows - Full Paneled, Partly Paneled and Glazed, wooden, Steel, Aluminum windows, Sliding Windows, Louvered Window, Bay window, Sizes of Windows recommended by BIS. Ventilators.

Vertical Communication: Means of Vertical Communication- Stair Case, Ramps, Lift, Elevators and Escalators. Terms used in staircase-steps, tread, riser, nosing, soffit, waist slab, balustrade, scotia, hand rails, newel post, landing, headroom, winder. Types of staircases (On the basis of shape): Straight, dog-legged, open well, Spiral, quarter turn, bifurcated, three quarter turn and Half turn,

Wall Finishes: Plastering – Necessity of Plastering, Procedure of Plastering, Single Coat Plaster, Double Coat Plaster, Rough finish. Precautions to be taken in plastering, defects in plastering. Pointing – Necessity, Types of pointing and procedure of Pointing, Painting

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Suggested Text Book:

1) Ghose, D. N., Construction Materials, Tata McGraw Hill, New Delhi. 2)S.K. Sharma, Civil Engineering Construction Materials, Khanna Publishing House, Delhi 3)Varghese, P.C., Building Materials, PHI learning, New Delhi. 4) Rang Wala, S.C., Engineering Materials, Charoter publishing, House, Anand. 5) Somayaji, Shan, Civil Engineering Materials, Pearson education, New Delhi. 6)Rajput, R.K, Engineering Materials, S. Chand and Co., New Delhi. 7) Sood H., Laboratory Manual on Testing of Engineering Materials, New Age Publishers, New Delhi. 8)Sharma C. P., Engineering Materials, PHI Learning, New Delhi. 9) Duggal, S. K, Building Materials, New International, New Delhi 10) S. P. Arora and Bindra., Building Construction, Dhanpat Rai Publication, Delhi. 11) Sushil Kumar., Building Construction, Standard Publication. 12) Ranga Wala, S. C., Building Construction, publishing, House, Anand. 13) Punmia B. C., and Jain A. K., Building Construction. 14) Sharma S. K., Building Construction, S. Chand and Co. Pvt. Ltd., New Delhi. 15) Janardan Jha, Building Construction, Khanna Publication. 16 Building Construction SNP Srivastava FPH 17 Adhunik Bhawan Nirman SNP Srivastava FPH 18 Building Construction

Course Outcomes:-

1. Predict the properties of building stones and its classifications.
2. Understand the concept of various methods of manufacture of bricks.
3. Identify rock using basic geological classification systems.
4. Obtain differentiate the fine aggregates and coarse aggregates under various views.
5. Explain various types of cements and their applications in construction. Various field and laboratory tests on cement.
6. Analyze the importance of mineral and chemical admixtures, requirements of the concrete in construction.
7. Explain different types of lintel, arches and the materials which are commonly used for construction. 8. Explain the suitability of floors in buildings like mosaic flooring, terrazzo flooring, rubber flooring, asphalt flooring.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – III

Branch	Subject Title	Subject Code
CE	Surveying	DCEP302

Course Objective:

1. To understand types of surveying works required.

2. To know the types of method and equipment's to be used for different surveys.

3. To know the use and operational details of various surveying equipment mpression test, hardness test, impact test fatigue test, endurance limit, bending test, shear test and non-destructive testing methods.

UNIT -1

Overview and classification of survey

Survey- Purpose and Use. Types of surveying- Primary and Secondary, Classification: Plane, Geodetic, Cadastral, Hydrographic and Aerial, Principles of Surveying. Scales: Engineer's scale, Representative Fraction (RF) and diagonal scale. .

UNIT -2

Chain survey

Instruments used in chain survey: Metric Chain, Tapes, Arrow, ranging rod, Line ranger, Offset rod, Open cross staff, Optical square.

Chain survey Station, Baseline, Check line, Tie line, Offset, Tie station.

Ranging- Direct and Indirect Ranging, Methods of Chaining, obstacles in chaining.

Errors in length: Instrumental error, personal error, error due to natural cause, random error, Principles of triangulation. Types of offsets: Perpendicular and Oblique, Conventional Signs, Recording of measurements in a field book

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT -3

Compass traverse survey

Compass Traversing-open, closed.

Technical Terms: Geographic/True, Magnetic Meridians and Bearings, Whole Circle Bearing system and Reduced Bearing system and examples on conversion of given bearing to another bearing (from one form to another), Fore Bearing and Back Bearing, Calculation of internal and external angles from bearings at a station, Dip of Magnetic needle, Magnetic Declination.

Components of Prismatic Compass and their Functions, Methods of using Prismatic Compass- Temporary adjustments and observing bearings.

Local attraction, Methods of correction of observed bearings - Correction at station and correction to included angles

Methods of plotting a traverse and closing error, Graphical adjustment of closing error

UNIT -4

Levelling and contouring

Basic terminologies: Level surfaces, Horizontal and vertical surfaces, Datum, Bench Marks, Permanent, Arbitrary and Temporary, Reduced Level, Rise, Fall, Line of collimation, Station, Back sight, Fore sight, Intermediate sight, Change point, Height of instruments.

Types of levels: Dumpy, Tilting and Auto level,Temporary adjustments of Level.

Types of Levelling Staff: Self-reading staff and Target staff, Reduction of level by Height of Instrument Method and Rise and Fall Method.

Levelling Types: Simple, Differential, Fly, Profile and Reciprocal Levelling.

Contour, contour intervals, horizontal equivalent, Uses of contour maps, Characteristics of contours, Methods of Contouring- Direct and indirect

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT -5

Theodolite Surveying

Fundamental axes of a theodolite & their relation. Temporary Adjustments. Face left. Face Right & concept of transiting. Measurement of horizontal & vertical Angles, prolonging a line. Traverse survey with a Theodolite, Computation by rectangular coordinates. Balancing a traverse by Gale''s traverse table, solution of simple problems on omitted measurements. Errors in theodolite survey & precautions for minimization.

Suggested Text Book/ Reference Book:

1. Punmia, B.C; Jain, Ashok Kumar; Jain, Arun Kumar, Surveying I, Laxmi Publications, New Delhi.

2. Basak, N. N., Surveying and Levelling, McGraw Hill Education, New Delhi.

3. Kanetkar, T. P.; Kulkarni, S. V., Surveying and Levelling volume I, Pune Vidyarthi Gruh Prakashan.

4. Duggal, S. K., Survey I, McGraw Hill Education, New Delhi.

5. Saikia, M D.; Das. B.M.; Das. M.M., Surveying, PHI Learning, New Delhi.

6. Subramanian, R., Fundamentals of Surveying and Levelling, Oxford University Press. New Delhi.

7. Text Book of Surveying and Measurement Vinod Kumar FPH

8. Surveying Sweta Kumari FPH 9. Basic Surveying Gopal krishnan FPH f copper alloys as per

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

CONTENTS: PRACTICAL

Preform any eight Experiments

1. Measure distance between two survey stations using chain, tape and ranging rods when two stations are inter visible.

2. Perform reciprocal ranging and measure the distance between two stations.

3. Determine area of open field using chain and cross staff survey.

4. Measure Fore Bearing and Back Bearing of survey lines of open traverse using Prismatic Compass.

5. Measure Fore Bearing and Back Bearing of a closed traverse of 5 or 6 sides and correct the bearings and included angles for the local attraction.

6. Undertake Survey Project with chain and compass for closed traverse for minimum 5 sides around a building.

8. Plot the traverse on A1 size imperial drawing sheet for data collected in Survey Project mentioned at practical No.6.

9. Undertake simple levelling using dumpy level/ Auto level and levelling staff.

10. Undertake differential levelling and determine Reduced Levels by Height of instrument method and Rise and fall method using dumpy level/Auto Level and levelling staff.

11. Undertake fly levelling with double check using dumpy level/ Auto level and levelling staff.

12. Undertake Survey Project for plotting contour map using block contouring method for a block of 150m x 150m with grid of 10m x10m.

13. Measure area of irregular figure using Digital planimeter

Course Outcomes:-

1. To learn to work as team, ethics and prepare technical reports of surveying.

2. To relate theoretical knowledge of surveying to resolve real field problems.

3. To establish horizontal control and vertical control by traversing and triangulation.

4. To prepare topographical map and contour map on an area.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – III

Branch	Subject Title	Subject Code
CE	Mechanics of Materials	DCEP303

Course Objective:

1. To learn properties of area and structural material properties.
2. To understand the concept of stress and strain.
3. To calculate shear force, bending moment for different shapes of structural elements and corresponding stresses.
4. To understand the concept of buckling loads for short and long columns.

UNIT-1

Moment of Inertia

Moment of inertia (M.I.): Definition, M.I. of plane lamina, Radius of gyration, section modulus, Parallel and Perpendicular axes theorems (without derivations), M.I. of rectangle, square, circle, semi-circle, quarter circle and triangle section (without derivations).

M.I. of symmetrical and unsymmetrical I-section, Channel section, T-section, Angle section, Hollow sections and built-up sections about centroidal axes and any other reference axis.

Polar Moment of Inertia of solid circular section

UNIT-2

Simple stresses and strains

Definition of rigid, elastic and plastic bodies, deformation of elastic body under various forces, Definition of stress, strain, elasticity, Hook's law, Elastic limit, Modulus of elasticity.

Type of Stresses-Normal, Direct, Bending and Shear and nature of stresses i.e., Tensile and Compressive stresses.

Standard stress strain curve for tor steel bar under tension, Yield stress, Proof stress, Ultimate stress, Strain at various critical points, Percentage elongation and Factor of safety.

Deformation of body due to axial force, forces applied at intermediate sections, Maximum and minimum stress induced, Composite section under axial loading.

Concept of temperature stresses and strain, Stress and strain developed due to tempera- true variation in homogeneous simple bar (no composite section)

Longitudinal and lateral strain, Modulus of Rigidity, Poisson's ratio, Biaxial and tri-axial stresses, volumetric strain, change in volume, Bulk modulus (Introduction only). Relation between modulus of elasticity, modulus of rigidity and bulk modulus (without derivation).

UNIT-3

Shear force and Bending moment

Types of supports, beams and loads Concept and definition of shear force and bending moment, Relation between load, shear force and bending moment (without derivation). Shear force and bending moment diagram for cantilever and simply supported beams subjected to point loads, uniformly distributed loads and couple (combination of any two types of loading), point of contraflexure

UNIT-4

Bending and Shear stresses in beams

Concept and theory of pure bending, assumptions, flexural equation (without derivation), bending stresses and their nature, bending stress distribution diagram. Concept of moment of resistance and simple numerical problems using flexural equation.

Shear stress equation (without derivation), relation between maximum and average shear stress for rectangular and circular section, shear stress distribution diagram.

Shear stress distribution for square, rectangular, circular, angle sections, channel section, I-section, T section. Simple numerical problems based on shear equation

UNIT-5

Columns

Concept of compression member, short and long column, Effective length, Radius of gyration, Slenderness ratio, Types of end condition for columns, Buckling of axially loaded columns.

Euler's theory, assumptions made in Euler's theory and its limitations, Application of Euler's equation to calculate buckling load.

Rankine's formula and its applicationto calculate crippling load.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Concept of working load/safe load, design load and factor of safety

Suggested Text Book/ Reference Book:

1. Bedi D.S. Strength of Materials, Khanna Publishing House, Delhi, Ed. 2018

2. Timoshenko, S., Strength of Materials, Vol. I, CBS, New Delhi.

3. Khurmi, R.S., Strength of Materials, S Chand and Co. Ltd. New Delhi.

4. Ramamrutham, S, Strength of Materials, Dhanpat Rai and sons, New Delhi.

5. Punmia B C, Strength of Materials, Laxmi Publications (p) Ltd. New Delhi.

6. Rattan S.S., Strength of Materials, McGraw Hill Education; New Delhi.

7. Bansal R K, Strength of Materials, Laxmi Publications. 8. Subramaniam R, Strength of Materials, Oxford University Press.

8. Mechanics of Structure Roshan Sinha FPH 10. Mechanics of Materials A.K.Ghosh FPH

Preform any eight Experiments

1. Study different components of Universal Testing Machine (UTM).

2. Perform Tension test on mild steel as per IS:432(1).

3. Perform tension test on Tor steel as per IS:1608, IS:1139.

4. Conduct compression test on sample test piece using Compression Testing Machine.

5. Conduct Izod Impact test on three metals. e.g., mild steel/ brass/aluminum/ copper /cast iron as per IS:1598.

6. Conduct Charpy Impact test on three metals. e.g., mild steel/ brass/aluminum/ copper /cast iron as per IS:1757.

7. Determine Water Absorption on bricks as per IS:1077

9. Determine Compressive strength of dry and wet bricks as per IS:3495(part I), IS:1077

10. Conduct Abrasion Test on flooring tiles (any one) e.g., Mosaic tiles, Ceramic Tiles Cement Tile.

11. Perform Single Shear and double shear test on any two metals e.g., Mild steel/ brass/aluminum/copper / cast iron as per IS:5242.

12. Plot Shear force and Bending Moment diagrams for cantilever, simply supported beams for different types of loads.

13. Plot Shear force and Bending Moment diagrams for overhanging beams for different types of loads including moment loading.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

14. Conduct Flexural test on timber beam on rectangular section in both orientations as per IS: 1708, IS:2408.

15. Conduct Flexure test on floor tiles IS:1237 or roofing tiles as per IS:654.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – III

Branch	Subject Title	Subject Code
CE	Mathematics-III	DCE301

Course Objectives: - The subject aims to provide the student with:

1. Mathematics fundamental necessary to formulate, solve and analyze engineering problems.

2. An understanding of Fourier Series and Laplace Transform to solve real world problems.

Unit -I

Integration:

Rules of integration (Integrals of sum, difference, scalar multiplication).

Methods of Integration.

Integration by substitution

Integration of rational functions.

Integration by partial fractions.

Integration by trigonometric transformation.

Integration by parts.

Definite Integration.

Definition of definite integral.

Properties of definite integral with simple problems.

Application of integration

Area under the curve.

Area between two curves.

Mean and RMS values.

Unit - II

Differential Equation

Definition of differential equation, order and degree of differential equation.

Formation of differential equation for function containing single constant.

Solution of differential equations of first order and first degree such as variable separable

type, reducible to Variable separable, Homogeneous, Non-homogeneous, Exact, Linear and

Bernoulli equations.

Applications of Differential equations.

Unit III

Laplace Transform

Definition of Laplace transform, Laplace transform of standard functions.

Properties of Laplace transform such as Linearity, first shifting, second shifting,

multiplication by tn, division by t.

Unit- IV

Fourier Series

Definition of Fourier series (Euler's formula).

Series expansion of continuous functions in the intervals

Series expansions of even and odd functions. Half range series.

Unit V

Numerical Methods

Solution of algebraic equation

Bisection method. Regularfalsi method.

Newton - Raphson method.

Solution of simultaneous equations containing 2 and 3 unknowns

Gauss elimination method.

Books:/ Reference

1. Mathematics for polytechnic, S. P. Deshpande , Pune Vidyarthi Griha Prakashan, Pune.

1. Calculus: single variable, Robert T. Smith, Tata McGraw Hill.

2. Higher Engineering Mathematics, B. S Grewal, Khanna Publication, New Delhi

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curriculum
Semester – III

Branch	Subject Title	Subject Code
CE	Geotechnical Engineering	DCEP305

Course Objective:

1. To Understand and determine physical and index properties of soil.

2. To estimate permeability and shear strain of soil.

UNIT-1

Overview of Geotechnical Engineering

Definition of soil. Importance of soil in Civil Engineering as construction material. Field application of geotechnical engineering for foundation design, pavement design, design of earth retaining structures, design of earthen dams (brief ideas only).

UNIT-2

Physical and Index Properties of Soils

Soil as a three phase system.

Water content, Determination of water content by oven drying method as per IS code.

Void ratio, porosity ,degree of saturation and density index.

Unit weight of soil mass – bulk unit weight, dry unit weight, unit weight of soil solids, saturated unit weight, submerged unit weight.

Determination of bulk unit weight and dry unit weight by core cutter method and sand replacement method as per IS code.

Specific gravity, determination of specific gravity by pycnometer.

Consistency of soil, Atterberg's limits of consistency: Liquid limit, plastic limit and shrinkage limit, plasticity index.

Determination of liquid limit, plastic limit and shrinkage limit as per IS code.

Particle size distribution, mechanical sieve analysis as per IS code, particle size distribution curve, effective diameter of soil, Uniformity coefficient and coefficient of curvature, well graded and uniformly graded soils

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT-3

Permeability of Soil

Definition of permeability

Darcy's law of permeability, coefficient of permeability, typical values of coefficient of permeability for different soil.

Factors affecting permeability

Determination of coefficient of permeability by constant head and falling head permeability tests, simple problems to determine coefficient of permeability.

Seepage through earthen structures, seepage velocity, seepage pressure, phreatic line, flow lines and equipotential lines.

Flow net, characteristics of flow net, application of flow net (no numerical problems) and I sections, bending stresses in symmetrical sections. Simple problems. Reinforced concrete beams, beam of uniform strength

UNIT-4

Shear strength of Soil

Shear failure of soil, field situation of shear failure

Concept of shear strength of soil.

Components of shearing resistance of soil– cohesion, internal friction.

Mohr-coulomb failure theory, Strength envelope, strength equation for purely. cohesive and cohesion less soils.

Laboratory determination of shear strength of soil – Direct shear test, Unconfined compression test & vane shear test, plotting strength envelope, determining shear strength parameters of soil.

UNIT-5

Compaction and stabilization of soils

Concept of compaction, purpose of compaction, field situations where compaction is required.

Standard proctor test – test procedure as per IS code, Compaction curve, optimum moisture content, maximum dry density, Zero air voids line.

Modified proctor test.

Factors affecting compaction.

Field methods of compaction – rolling, ramming & vibration.

California bearing ratio, CBR test, significance of CBR value.

Concept of soil stabilization, necessity of soil stabilization

UNIT-6

Bearing capacity of Soil

Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure.

Terzaghi's analysis and assumptions .

Field methods for determination of bearing capacity – Plate load test and standard penetration test. Test procedures as Per IS:1888 & IS:2131.

Definition of active earth pressure and passive earth pressure, structures subjected to earth pressure in the field.

Suggested Text book / Reference book:

1. Punmia, B.C., Soil Mechanics and Foundation Engineering, Laxmi Publication, Delhi.

2. Murthy, V.N.S., A text book of soil mechanics and foundation Engineering, CBS Publishers.

3. Ramamurthy, T.N. & SitharamT.G, Geotechnical Engineering (Soil Mechanics), S Chand and Company LTD., New Delhi.

4. Raj, P. Purushothama, Soil Mechanics and Foundation Engineering, Pearson India, New Delhi.

5. Kasamalkar, B. J., Geotechnical Engineering, Pune Vidyarthi Griha Prakashan, Pune.

6. Arora K R, Soil Mechanics and Foundation Engineering, Standard Publisher.

7. Geo-Technical Engineering Kuldep Singh FPH 8. Geo-Technical Engineering K.N. Prasad FPH 9. Geo-Technical Engineering Ashok Jain FPH

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Lab Experiments:-

1. DETERMINATION OF MOISTURE CONTENT

2. DETERMINATION OF SPECIFIC GRAVITY

3. FIELD DENSITY TEST

4. GRAIN SIZE ANALYSIS a. Sieve Analysis b. Hydrometer Analysis

5. DETERMINATION OF CONSISTENCY LIMITS

6. DENSITY INDEX/RELATIVE DENSITY TEST

7. PERMEABILITY TEST a. Constant Head Method b. Falling Head method

8. PROCTOR TEST

9. VANE SHEAR TEST

10. DIRECT SHEAR TEST

11. UNCONFINED COMPRESSION TEST

12. UNDRAINED TRIAXIAL TEST

13. CONSOLIDATED TEST

14. CALIFORNIA BEARING RATIO TEST

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Credit System and Marks Distribution:-

Semester-IV

SL. No.	Category	SubjectCode	Subject Name	L	T	P	Credits	Internal Max	External Max	External Min	Total Max	Total Min
1	PCC	DCEP401	Hydraulics	3	0	0	3	30	70	21	100	35
2	PCC	DCEP402	Advance Surveying	3	0	0	3	30	70	21	100	35
3	PCC	DCEP403	Theory of structure	3	1	0	4	30	70	21	100	35
4	PCC	DCEP404	Building Planning and Drawing	2	0	0	2	30	70	21	100	35
	PCC	DCEP405	Transportation Engineering	3	0	0	3					
5	PEC		Program Elective-I	3	0	0	3	30	70	21	100	35

Program Elective-I (Choose any one)

SL. No.	Category	SubjectCode	Subject Name	L	T	P	Credits	Internal Max	External Max	External Min	Total Max	Total Min
1	PEC	DCEPE405	Construction Management	3	0	0	3	30	70	21	100	35
2	PEC	DCEPE406	Precast and Prestressed Concrete	3	0	0	3	30	70	21	100	35
3	PEC	DCEPE407	Rural Construction Technology	3	0	0	3	30	70	21	100	35

PRACTICAL DEMONSTRATION

SL. No.	Category	SubjectCode	Subject Name	L	T	P	Credits	Internal Max	External Max	External Min	Total Max	Total Min
1	PCC	DCEP451	Hydraulics Lab	0	0	2	1				50	25
2	PCC	DCEP454	Building Planning and Drawing	0	0	4	1				50	25
4	PCC	DCEP455	Transportation Engineering Lab	0	0	2	1				50	25
	PROJ		Minor Project			4	2					
5			Essence of Indian Knowledge & Tradition	0	0	0	0				50	25
	TOTAL						**23**					

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – IV

Branch	Subject Title	Subject Code
CE	Advance Surveying	DCEP402

Course Objective:-The student will be made conversant with the various instruments & appliance used in surveying. He will be taught chain survey, plane table survey, compass survey and triangulation survey and would be introduced to the modern survey methods**.**

Unit –I

CURVES:

Need & benefits of its provision, Elements of Circular curves, Degree & Radius of curve & their relation. Problems on simple curves, compound curves, reverse curves & vertical curves. Definition & requirements of transition curves. Length of transition curve: Layout of circular curve with chain & tape with theodolite.

Unit –II

TACHEMETRY:

Principle of tacheometry; Instruments used in tacheometry; Methods of techeometry; determination of Stadia constants; Tacheometric surveying with line of collimation (i) horizontal (ii) inclined with level staff held vertical.

Unit –III

MODERN SURVEYING:

Aerial Surveying & Ground Photogrammetry; Elementary knowledge of both with the basic principles involved especially of stereoscopic vision. Advantages of aerial surveying over conventional methods. Drone surveying basics.

Unit –IV

Total Station: Principle of electronic measurement of distance and angles; construction and working with Total Station; Errors; Application and recent developments in Total Station. Auto level, GPS.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit –V

Measurement of Area and Volume

Components and use of Digital planimeter. Measurement of area using digital planimeter.

Measurement of volume of reservoir from Contour map.

Book Recommended: Text Books

1. Surveying & leveling, Vol. II - Kanethar & Kulkarni

2. Surveying, Vol. II - Dr. B. C. Punami

3. Surveying, Vol. II - D. Clark

4. Photogrammetry - F. H. Moffitt

5. Air Photography Applied to Surveys - C. A. Mart

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – IV

Branch	Subject Title	Subject Code
CE	Hydraulics	DCEP401

Course Objective:

1. To understand parameters associated with fluid flow and hydrostatic pressure.

2. To know head loss and water hammer in fluid flowing through pipes.

3. To learn different types of pumps and their uses

UNIT-1

Pressure measurement and Hydrostatic pressure

Technical terms used in Hydraulics–fluid, fluid mechanics, hydraulics, hydrostatics and hydrodynamics–ideal and real fluid, application of hydraulics.

Physical properties of fluid density specific volume, specific gravity, Specific Weight, relative density, compressibility, cohesion, adhesion, surface tension, capillarity, viscosity-Newton's law of viscosity.

Various types of pressure–Atmospheric Pressure, Gauge Pressure, Absolute Pressure, Vacuum Pressure. Concept of Pressure head and its unit, Conversion from intensity of pressure to pressure head and vice-versa, Formula and Simple problems, Pascal's law of fluid pressure and its uses.

Measurement of differential Pressure by different methods.

Variation of pressure with depth, Pressure diagram, hydrostatic pressure and center of pressure on immersed surfaces and on tank walls.

Determination of total pressure and center of pressure on sides and bottom Of water tanks, sides and bottom of tanks containing two liquids, vertical surface in contact with liquid on either side.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT-2

Fluid Flow Parameters

Types of flow, Gravity and pressure flow, Laminar, Turbulent, Uniform, non uniform, Steady, Unsteady flow. Reynolds number.

Discharge and its unit, continuity equation of flow.

Energy of flowing liquid:potential, kinetic and pressure energy.

Bernoulli's theorem: statement, assumptions, equation.

Application of Bernoulli's theorem: Venturi meter , Orifice meter, Pitot Tube

Momentum Equation. Simple numerical problems based on above topics.

UNIT-3

Flow through pipes

Major Head loss in pipe: Frictional loss and its computation by Darcy's Weisbach

Minor losses in pipe: loss at entrance, exit, sudden contraction, sudden enlargement and fittings .

Flow through pipes in series, pipes in Parallel and Dupuit's equation for equivalent pipe.

Hydraulic gradient line and total energy line.

Water hammer in pipes: Causes and Remedial measures.

Discharge measuring device for pipe flow: Venturimeter -construction and working.

Discharge measurement using Orifice, Hydraulic Coefficients of Orifice. Simple numerical problems based on above topics.

UNIT-4

Flow through open channels:

Classification of low, uniform flow, Prismatic and non-prismatic channel, hydraulically efficient channel cross-sections, specific energy, specific energy curves, critical flow in rectangular channels. Energy and Momentum Principle: Critical depth Concepts of specific energy, and specific force, application of specific energy, principle for interpretation of open channel flow phenomena, floe through vertical and horizontal contractions and concepts of Hydraulic jump, surges and water waves.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT-5

Hydraulic Machines

Concept of pump, Types of pump Centrifugal, Reciprocating, Advantages&Disadvantages,

Priming. Suction head, delivery head, static head, Manometric head.

Power of centrifugal pump.

Selection and choice of pump.

Turbines: Definition&Types. Difference between Pump&Turbines.

Suggested Text Book:

1. Modi, P.N.and Seth, S.M., Hydraulics and Fluid Mechanics, Standard book house,

2. R.K. Bansal, A Text book of Fluid Mechanics & Hydraulic Machines, Laxmi
   Publications Pvt. Ltd. 3. R.L. Anand, Hydraulics, Foundation Publishing House.

Contents: Practical Perform any eight experiments

1. Use piezometer to measure pressure at a given point.

2. Use Bourdon's Gauge to measure pressure at a given point.

3. Use Utube differential manometer to measure pressure difference between twog iven
points.

4. Use Bernoulli's apparatus to apply Bernoulli's theorem to get total energy line for a flow in
a closed conduit of varyin gcross sections.

5. Use Reynold's apparatus to determine type of flow.

6. Use Friction factor Apparatus to determine friction factor for a given pipe.

7. Determine minor losses in pipe fittings due to sudden contraction and sudden enlargement.

8. Determine the coefficient of discharge for a given Venturi meter

9. Determine the hydraulic coefficients for sharp edge orifice.

10. Use Current meter to measure the velocity of flow of water in open channel.

11. Use Pitot tube to measure the velocity of flow of water in open channel.

12. Use triangular notch to measure the discharge through open channel.

13. Use Rectangular notch to measure the discharge through open channel.

14. Determine the Manning's constant or Chezy's constant for given rectangular channel
section.

15. Study & use of water meter.

16. Study of a model of centrifugal and reciprocating pump

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – IV

Branch	Subject Title	Subject Code
CE	Construction Management	DCEPE405

Course Objectives:

Following are the objectives of this course:

1. To understand the contract management and associated Labour laws.

2. To prepare and understand the principals involved in site layout.

3. To know the procedure for scheduling of various activates in construction project.

4. To understand the Labour laws, procedure for arbitration, settlements.

5. To know different safety measures in construction projects.

Course Content

Unit – I Construction industry and management

Organization-objectives, principles of organization, types of organization: government/public and private construction industry, Role of various personnel in construction organization Agencies associated with construction work- owner, promoter, builder, designer, architects. Role of consultant for various activities: Preparation of Detailed Project Report (DPR), monitoring of progress and quality, settlement of disputes.

Unit – II Site Layout

Principles governing site layout.

Factors affecting site layout.

Preparation of site layout.

Land acquisition procedures and providing compensation.

Unit- III Planning and scheduling

Identifying broad activities in construction work & allotting time to it, Methods of Scheduling, Development of bar charts, Merits & limitations of bar chart. Elements of Network: Event, activity, dummy activities, Precautions in drawing Network, Numbering the events.101 Civil Engineering Curriculum Structure CPM networks, activity time estimate, Event Times by forward & backward pass calculation, start and finish time of activity, project duration. Floats: Types of Floats-Free, independent and total floats, critical activities and

critical path, Purpose of crashing a network, Normal Time and Cost, Crash Time and Cost, Cost slope, Optimization of cost and duration.

Material Management- Ordering cost, inventory carrying cost, Economic Order Quantity Store management, various records related to store management, inventory control by ABC technique, Introduction to material procurement through portals (e.g. www.inampro.nic.in)

Unit IV Construction Contracts and Specifications

Types of Construction contracts

Contract documents, specifications, general special conditions

Contract Management, procedures involved in arbitration and settlement (Introduction only)

Unit– V Safety in Construction

Safety in Construction Industry—Causes of Accidents, Remedial and Preventive Measures.

Labour Laws and Acts pertaining to Civil construction activities (Introduction only)

Suggested learning resources

1. Sharma S C and Deodhar S V, Construction Engineering and Management, Khanna Book Publishing, New Delhi

1. Gahlot,P.S. and Dhir, B.M Construction planning and management New Age International (P) Ltd. Publishers, New Delhi.

2. Shrivastava, U.K., Construction planning and management, Galgotia Publication Pvt Ltd. New Delhi

3. Mantri, S., The A To Z of Practical Building Construction and its Management, Satya Prakashan New Delhi

4. Khanna, O.P. , Industrial Engineering and management, Dhanpat Rai New Delhi

5. Punmia, B.C. and Khandelwal, K.K., Project Planning and Controlling with PERT And CPM, Laxmi Publications (P)Ltd.

3. Sengupta, B., Guha H., Construction Management and Planning, Tata-McGraw Hill.

4. Harpal, Singh, Construction Management and accounts, Mc-Graw Hill.

5. Sharma, S.C., Industrial Engineering and Management, Khanna Publications, New Delhi

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Course outcomes:

After competing this course, student will be able to:

• Understand the contract management and associated labour laws.

• Prepare and understand the nuances of executing the site layout.

• Prepare networks and bar charts for the given construction project.

• Understand the intricacies of disputes, related arbitration and settlement laws.

• Apply safety measures at construction projects.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – IV

Branch	Subject Title	Subject Code
CE	**Precast and Prestressed Concrete**	**DCEPE406**

Course Objectives:- Following are the objectives of this course:

1. To introduce various types of precast and prefabricated concrete elements.

2. To know advantages and disadvantages of precast and prefabricated concrete elements.

3. To understand prestressing methods, systems for Reinforced Concrete members.

4. To learn issues involved in design of prestressing system and loss of prestressing.

Course Content:

Unit – I Precast concrete Elements

Advantages and disadvantages of precast concrete members

Non-structural Precast elements - Paver blocks, Fencing Poles, Transmission Poles, Manhole Covers, Hollow and Solid Blocks, kerb stones as per relevant BIS specifications

Structural Precast elements – tunnel linings, Canal lining, Box culvert, bridge panels, foundation, sheet piles

Testing of Precast components as per BIS standards

Unit– II Prefabricated building

Precast Structural Building components such as slab panels, beams, columns, footings, walls, lintels and chajjas, staircase elements, Prefabricated building using precast load bearing and non load bearing wall panels, floor systems - Material characteristics, Plans & Standard specifications**,** Modular co-ordination, modular grid, and finishes**,** Prefab systems and structural schemes and their classification including design considerations**,** Joints – requirements of structural joints and their design considerations**,** Manufacturing, storage, curing, transportation and erection of above elements, equipment needed

Unit– III Introduction to Prestressed Concrete

Principles of pre-stressed concrete and basic terminology

Applications, advantages and disadvantages of prestressed concrete

Materials used and their properties, Necessity of high-grade materials

Types of Pre-stressing steel -Wire, Cable, tendon, Merits-demerits and applications

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit– IV Methods and systems of prestressing

Methods of prestressing – Internal and External pre-stressing, Pre and Post tensioning-applications

Systems for pre tensioning – process, applications, merits and demerits - Hoyer system

Systems for post-tensioning - process, applications, merits and demerits - Freyssinet system, Magnel Blaton system, Gifford Udall system.

Prestressing force in Cable, Loss of prestress during the tensioning process - loss due to friction, length effect, wobbling effect and curvature effect, (Simple Numerical problems to determine loss of pre-stress), Loss of pre-stress at the anchoring stage.

Loss of pre-stress occurring subsequently: losses due to shrinkage of concrete, creep of concrete, elastic shortening, and creep in steel, (Simple Numerical problems to determine loss of pre-stress). BIS recommendations for percentage loss in case of Pre and Post tensioning.

Unit– V Analysis and design of Prestressed rectangular beam section

Basic assumptions in analysis of pre-stressed concrete beams.

Cable Profile in simply supported rectangular beam section – concentric, eccentric straight and parabolic

Effect of cable profile on maximum stresses at mid span and at support.

Numerical problems on determination of maximum stresses at mid spans with linear (concentric and eccentric) cable profiles only.

Simple steps involved in Design of simply supported rectangular beam section (No numerical problems)

Suggested learning resources

1. Krishna Raju, N., Pre-stressed Concrete, Tata McGraw Hill, New Delhi.
2. Shrikant B. Vanakudre, Prestressed Concrete, Khanna Publishing House, New Delhi
3. Marzuki, Nor Ashikin, Pre Cast and Pre Stress Technology: Process, Method and Future Technology, Createspace Independent Publication.
5. Indian Concrete Institute., Handbook on Precast Concrete buildings.
6. Elliott, Kim S., Precast Concrete Structures, CRC Press, New York.
7. Lin, T.Y., Design of Pre-Stressed Concrete Structures, John Wiley and Sons, New York Nagarajan, Pravin., Pre-stressed Concrete Structures, Pearson Education India
8. BIS, New Delhi. IS 12592 Precast Concrete Manhole Cover and Frame, BIS, New Delhi

9. BIS, New Delhi. IS 15658 Precast concrete blocks for paving - Code of Practice, BIS, New Delhi

10. BIS, New Delhi. IS 15916 Building Design and Erection Using Prefabricated Concrete – Code of Practice, BIS, New Delhi

11. BIS, New Delhi. IS 15917 Building Design and Erection Using Mixed/Composite Construction - Code of Practice, BIS, New Delhi

12. BIS, New Delhi. IS 458 Precast Concrete Pipes (with and without reinforcement) — Specification, BIS, New Delhi

Course outcomes:

After completing this course, student will be able to:

Civil Engineering Curriculum Structure 100

• Select the relevant precast concrete element for a given type of construction.

• Use relevant components for prefabricated structures.

• Justify the relevance of prestressed element in a given situation.

• Select relevant methods / systems for given construction work.

• Propose suitable cable profile for the given prestressed concrete members

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – IV

Branch	Subject Title	Subject Code
CE	Rural Construction Technology	DCEPE407

Course Objectives: Following are the objectives of this course:

1. To learn development and planning of low cost housing infrastructure.

2. To know about different government schemes for rural development.

3. To understand techniques for rural road construction as per IRC stipulations.

4. To learn rural irrigation techniques and watershed management.

Course Contents:

Unit I - Rural Development and Planning

Scope; development plans; various approaches to rural development planning.

Significance of rural development.

Rural development programme/ projects.

Unit II -Rural Housing

Low cost construction material for housing

Composite material- ferro-cement & fly ash, autoclaved calcium silicate bricks and soil-stabilized un-burnt brick; Plinth protection of mud walls.

Water-proof and fire-retardant roof treatment for thatch roofs. Pre-cast stone masonry, rattrap zond for walls; Panels for roof, ferro-cement flooring/roofing units.

Biomass - types of fuels such as firewood, agricultural residues, dung cakes.

Renewable energy and integrated rural energy program - Objectives, Key elements, Implementation, Financial provisions, sources of renewable energy.

Working of gobar gas and bio gas plants.

Unit III Water Supply and Sanitation for Rural Areas

Sources of water: BIS & WHO water standards.

Quality, Storage and distribution for rural water supply works.

Hand pumps-types, installation, operation, and maintenance of hand pumps.

Conservation of water - rainwater harvesting, drainage in rural areas.

SESSION 2023 ONWARDS

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Construction of low cost latrines: Two pit pour flush water seal, septic tank etc.

Low cost community and individual Garbage disposal systems, Ferro-cement storage tanks.

Unit IV - Low Cost Rural Roads

Broad categories of Pavement Layers, types of Granular Sub-Bases and Bases.

Guidelines for Surfacing of Rural Road as per relevant IRC codes.

Pradhan Mantri Gram Sadak Yojna (PMGSY)- Highlights of Scheme.

103 Civil Engineering Curriculum Structure

Unit V - Low Cost Irrigation

Design consideration and construction of tube-well, drip & sprinkler irrigation systems.

Watershed and catchment area development –problems and features of watershed management.

Watershed management structures - K. T. weir, Gabian Structure, Cement Plug, Contour Bunding, Farm pond, Bandhara system.

Suggested learning resources:

1. Madhov Rao A G, and Ramachandra Murthy, D S, Appropriate Technologies for low cost Housing Oxford and IBH Publishing Co. Pvt. Ltd.
2. CBRI, Roorkee, Advances in Building Materials and Constriction.
1. Desai,Vasant , Rural Development in India: Past, Present and Future : a Challenge in the Crisis,
2. Himalaya Publishing House, Delhi.
3. Rastogi, A.K.Rural Development Strategy, Wide Vision, Jaipur.
4. Singh, Katar, Rural Development Principles, Policies and Management, Sage Publications India
5. Pvt Ltd.
5. Gaur, Keshav Dev, Dynamics of Rural Development, Mittal Publications, Delhi.
6. Document Published by Ministry of Rural development, Govt. of India, Ministry of Rural development.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Course outcomes:

After completing this course, student will be able to:

1. Plan low cost housing using rural materials.

2. Make use of relevant government schemes for construction of roads and housing.

3. Use guidelines for rural road construction.

4. Implement different irrigation systems for rural areas.

5. Identify the need of watershed management in rural areas.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Diploma Engineering in CIVIL ENGG.

New Scheme Based on AICTE Flexible Curricula

Semester – IV

Branch	Subject Title	Subject Code
CE	THEORY OF STRUCTURE	DCEP403

Course Objective:

To learn concept of eccentric loading and stresses in vertical members like column, chimneys, dam.

To analyze beams using various methods like slope deflection, three moment and moment distribution.

To understand different methods of finding axial forces in trusses.

Unit I

Direct and Bending stresses in Vertical members:

Concept of direct and eccentric loads, eccentricity about one principal axis, nature of stress distribution diagram maximum and minimums tresses, resultant stress

Condition for no tension or zero stress at extreme fiber, Limit of eccentricity, core of section for rectangular and circular cross sections, Middle third rule.

Column, pillar, chimney of uniform cross section subjected to lateral wind pressure, Co-efficient of wind resistance &resultant stress distribution at their bases.

Unit II

Slope and deflection:

Concept of slope and deflection, stiffness of Beam.

Relation between bending moment, slope, deflection & radius of curvature (no derivation)

Double integration method to find slope and deflection of simply supported and cantilever beam subjected to concentrated and uniformly distributed load.

Macaulay method to find slope and deflection of simply supported and cantilever beam subjected to concentrated and uniformly distributed load

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit III

Fixed and continuous Beam:

Different types of Determinate & Indeterminate Structures & Stability of structure.

Concept of fixity, effect of fixity, advantages and disadvantages of fixed beam over simply supported beam.

Principle of superposition, Fixed end moments from first principle for beam subjected to point load, UDL over entire span.

Application of standard formulae in finding end moments, end reactions and drawing S.F. and B.M. diagrams for a fixed beam. (Derivation need not to be asked in exam).

Clapeyron's theorem of three moments (no derivation). Application of theorem maximum up to three spans and two unknown support moment only, Support at same level, spans having same & uniform moment of inertia subjected to concentrated loads and uniformly distributed loads over entire span.

Drawing SF &BM diagrams showing point of contraflexure for continuous beams.

Unit IV

Moment distribution method:

Introduction, sign convention.

Carry over factor, stiffness factor, Distribution factor.

Application of moment distribution method for various types of continuous beams subject ed to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia upto three spans and two unknown support moment only

Unit V

Simple trusses:

Types of trusses (Simple, Fink, compound fink, French truss, pratt truss,Howe truss, truss, King post and Queen post truss).

Calculate support reactions for trusses subjected to point loads at joints

Calculate forces in members of truss using Method of joints and Method of sections.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Suggested Text Book:

1. Theory of structures, S. Ramamrutham, Dhanpatrai & Sons.

2. Mechanics of structures, S.B. Junnarkar Charotar Publishing House, Anand.

3. Analysis of Structures V.N. Vazirani & M.M. Ratwani

4. Theory of Structures R.S. Khurmi, S. Chandand Co., New Delhi.

5. Theory of Structure, R.S. Guha, FPH

COURSE OUTCOMES

1. Analyze stresses induced in vertical member subjected to direct and bending loads.

2. Analyze slope and Deflection in fixed and continuous beams. and compare with permissible limits according to IS code

3. Analyze continuous beam using Moment Distribution Method under different loading conditions.

4. Evaluate axial forces in the members of simple truss

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Diploma Engineering in CIVIL ENGG.

New Scheme Based on AICTE Flexible Curricula

Semester – IV

Branch	Subject Title	Subject Code
CE	Building Planning and Drawing	DCEP404

Course Objective:

1. To learn basic principles of building planning and drawing.

2. To know graphical representation of various components of buildings.

3. To draw complete plan and elevation of a building.

4. To learn basics of perspective drawings and Computer Aided Draw

Unit I

Conventions and Symbols:

Conventions as per IS 962, symbols for different materials such as earth work, brick work, Stone work, concrete, wood work and glass.

Graphical symbols for doors and windows, Abbreviations, symbols for sanitary and electrical installations.

Types of lines-visible lines, centre line, hidden line, section line, dimension line, extension line, pointers, arrow head or dots. Appropriate size of lettering and numerals for titles, sub-titles notes and dimensions.

Types of scale, criteria for Proper Selection of scale for various types of drawing.

Sizes of various standard papers/sheets.

Unit II

Planning of Building:

Principles of planning for Residential and Public building- Aspect, Prospect ,Orientation, Grouping ,Privacy ,Elegance ,Flexibility ,Circulation, Furniture requirements ,Sanitation, Economy.

Space requirement and norms for minimum dimension of different units in the residential and public buildings as per IS 962.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Rules and bye-laws of sanctioning authorities for construction work.

Plot area, built up area, super built-up area, plinth area, carpet area, floor area and FAR (Floor Area Ratio).

Line plans for residential building of minimum three rooms including water closet (WC), bath and stair case as per principles of planning.

Line plans for public building-school building, primary health centre, hostel and Library

Unit III

Drawing of Load Bearing Structure:

Drawing of Single-story Load Bearing residential building(2BHK)with stair case. Data drawing–plan, elevation, section, site plan, schedule of openings, construction notes with specifications, area statement, Planning and design of stair case- Rise and Tread for residential and public building.

Working drawing–developed plan, elevation, and section passing through stair case or WC and bath. Foundation plan of Load bearing structure.

Unit IV

Drawing of Framed Structure:

Drawing of Two storied Framed Structure(G+1), residential building(2BHK) with stair case.

Data drawing– developed plan, elevation, section, site plan, schedule of openings, construction notes with specifications, area statement.

Working drawing of Framed Structure– developed plan,elevation, section passing through stair case or WC and bath.

Foundation plan of Framed Structure.

Details of RCC footing, Column, Beam, Chajjas, Lintel, Staircase and slab.

Drawing with C AD-Draw commands, modify commands, layer commands.

Unit V

Perspective Drawing:

Definition of perspective drawing, Types of perspective, terms used in perspective drawing, principles used in perspective drawing. Two Point Perspective of small objects only such as steps, monuments, pedestals.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Books / References:-_

1. S.S. Bhavikatti Emeritus Professor BVB College of Engineering and Technology Hubli, INDIA M.V. Chitawadagi Professor BVB College of Engineering and Technology Hubli, INDIA

2. Building Planning and Drawing textbook are N.Kumara Swamy and A.Kameswara Rao

3. Civil Engg: Drawing Balagopal and RS Prabhu – Spades

4. Time Savers standards for Building types – Joseph Deciara and john Callender Tata Mc Graw hill 3. NBC, KMBR

COURSE OUTCOMES:-

1. Interpret the symbols, signs and conventions from the given drawing.

2. Prepare line plans of residential and public buildings using principles of planning.

3. Prepare submission and working drawing for the given requirement of Load Bearing structure.

4. Prepare submission and working drawing using CAD for the given requirement of Frame structure

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Diploma Engineering in CIVIL ENGG.

New Scheme Based on AICTE Flexible Curricula

Semester – IV

Branch	Subject Title	Subject Code
CE	Transportation	DCEP405

Course Objectives:-

1. Understand the principles and practices of transportation engineering and urban transportation planning.
2. Understand the interactions between transportation planning and land use planning, economics, social planning and master plans.
3. Gain the facility of utilizing the state of the art techniques and models in the field.
4. Have the capability to identify and solve transportation problems within the context of data availability and limitations of analysis tools

Unit-I

Introduction and Highway Development in India: Different modes of Transportation, Characteristics of Road Transport, Brief history and development of Road Construction, Jayakar Committee Recommendations, Road Classification, Long term Road Plans, Vision – 2021, NHDP, Rural Roads Development Plan Highway Planning: Principles of highway Planning, Road development and financing, privatization of highways, highway alignment requirements, engineering survey for highway location.

Unit-II

Geometric Design of Highways: Road Cross-sectional Elements: Width of Carriageway, Formation Width, Right of Way, Camber, Shoulder, Kerb, Road Margins, Design Speed, Sight Distances, Design of Horizontal curves, Super elevation, Extra widening on Horizontal curves, Transition curves, Set back distance at curves, Gradient, Design of Vertical curves –Summit and Valley curves

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit-III

Traffic Characteristics: Traffic Studies, Traffic Volume, Traffic Forecast, Traffic Capacity, Traffic Control Devices, Parking Studies, Accident Studies, Highway Safety, Intersections-At grade and Grade Separated Intersections, Traffic Control Devices, Traffic Signs, Traffic Signal Systems, Traffic Islands, Road Markings, Highway Lighting, Intelligent, Transportation Systems

Unit-IV

Highway Materials and Construction Subgrade Soil, Aggregates, Bitumen, Tar, Emulsion, Modified Bitumen, Cement Concrete, Tests on Aggregates, Tests on Bitumen, Bituminous Mix Design, Construction of WBM roads, Soil Stabilized Roads, Different types of Bituminous Constructions, Construction of cement Concrete Pavements, Equipment used in Highway Construction

Books/REFERENCES

1. Highway Engineering, Khanna & Justo, Khanna Publication.
2. Transportation Engineering, N. L. Arora, S. P. Luthara, I.P.H. New Delhi
3. Transportation Engineering, Vazarani & Chandola, Khanna Publication
4. Road, Railway, Bridges, Biridi & Ahuja, S.B.H. New Delhi Transportation Engineering, Kamala, T.M.H. New Delhi

Transportation Engg. Lab

1. Flakiness index test
2. Determination of binder content for asphalt mix
3. Penetration test
4. Ductility test
5. Softening point test
6. Flash &fire point test
7. Dynamic cone penetrometer
8. Los-Angeles abrasion test 9. Specific gravity of bitumen

COURSE OUTCOMES:-The students after completion of this course will have an in depth knowledge in Traffic Engineering , Transport Planning, Highway Design and Construction, Sustainable Urban and Transport Development and will be efficient enough to take up projects in the field

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Credit System and Marks Distribution:-

				\[Semester-V\]								

SL. No.	Category	Subject Code	Subject Name	Periods			Credits	Internal	External		Total	
				L	T	P		Max	Max	Min	Max	Min
1	PCC	DCEP501	Design of steel Structure	2	1	0	3	30	70	21	100	35
2	PCC	DCEP502	Estimating and Costing	2	1	0	3	30	70	21	100	35
3	PCC	DCEP503	Water Resources Engineering	3	0	0	3	30	70	21	100	35
4	PEC		Program Elective-II	3	0	0	3	30	70	21	100	35
5	PEC		Program Elective-III	3	0	0	3	30	70	21	100	35
6	OEC		Open Elective-I	3	0	0	3	30	70	21	100	35
PRACTICAL DEMONSTRATION												
1	IN		Summer Internship-II (after 4th sem)	0	0	0	3				50	25
											50	25
TOTAL							**21**					

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Elective Papers for semester-V

				Periods				Marks Distribution				
Sr No	Category	Subject Code	Subject Name				Credits	Internal	External		Total	
				L	T	P		Max	Max	Min	Max	Min
Program Elective-II (Choose any one)												
1	PEC	DCEPE504	Traffic Engineering	3	0	0	3	30	70	21	100	35
2	PEC	DCEPE505	Solid Waste Management	3	0	0	3	30	70	21	100	35
3	PEC	DCEPE506	Advanced Construction Technology	3	0	0	3	30	70	21	100	35
Program Elective-III (Choose any one)												
1	PEC	DCEPE507	Pavement Design & maintenance	3	0	0	3	30	70	21	100	35
2	PEC	DCEPE508	Green Building and Energy Conservation	3	0	0	3	30	70	21	100	35
3	PEC	DCEPE509	Building Services and Maintenance	3	0	0	3	30	70	21	100	35
Open Elective-I (Choose any one)												
1	OEC	DCEOE510	Industrial Instrumation	3	0	0	3	30	70	21	100	35
2	OEC	DCEOE511	Web Technology	3	0	0	3	30	70	21	100	35
3	OEC	DCEOE512	Power Plant Engineering	3	0	0	3	30	70	21	100	35

SESSION 2023 ONWARDS

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	Design of steel Structure	DCEP501

Course Objectives: Following are the objectives of this course:

To learn the concept of limit state design for tension and compression steel members.

To learn the concept of limit state design of steel beams.

To understand design of RCC elements.

To know the design of short and long RCC columns

Unit-I

Structural Steel and Sections:

Properties of structural steel as per IS Code

Designation of structural steel sections as per IS handbook and IS:800 – 2007

Unit-II

Riveted Connections:

Types of rivets, permissible stresses in rivets, types of riveted joints, specifications for riveted joints as per IS 800. Failure of a riveted joint. Assumptions in the theory of riveted joints. Strength and efficiency of a riveted joint. Design of riveted joints for axially loaded members (No Staggered riveting).

Unit-III

Bolted and Welded connections:

Types of bolts and bolted joints, specifications for bolted joints as per IS: 800 – 2007

Types of welds and welded joints, advantages and disadvantages of welded joints and bolted joints design of fillet and butt weld. Plug and slot welds (Descriptive No numerical on plug and slot welds)

Unit-IV

Tension Members :-

Analysis and design of single and double angle section tension members and their riveted and welded connections with gusset plate as per IS:800

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Compression Members:-

Analysis and design of single and double angle sections compression members (struts) and their welded connections with gusset plate as per IS:800 115

Columns:

Concept of buckling of columns, effective length and slenderness ratio, permissible stresses in compression as per IS: 800 for different end conditions. Analysis and Design of axially loaded single section steel column Types of column bases (Descriptive only)

Beam and column, frame and seated connections (descriptive only, no design)

Books and Reference

1) N. Subramanian; Steel Structures, Oxford Publication

2) K. S. Sai Ram; Design of Steel Structures, Pearson

3) Arya & Ajmani; Design of Steel Structures

4) Dayaratnam ; Design of Steel Structures

5) B.C.Punamia; Steel Structures, Laxmi Publication

Course outcomes: After completing this course, student will be able to perform:

1. Design of steel tension and compression member.
2. Design of steel beams including check for shear.
3. Design of singly and doubly reinforced RCC beam.
4. Design of shear reinforcement in RCC beams.
5. Design of RCC column as per IS 456.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	Estimating and Costing	DCEP502

Course Objective:

1. Impart the knowledge of Estimating, Costing and Valuation for Civil Engineering Structures.

2. Prepare and evaluate contract documents.

Unit-I

Fundamentals of Estimating and Costing:

Estimating and Costing – Meaning, purpose, Administrative approval, Technical Sanction and Budget provision.

Types of estimates – Approximate and Detailed estimate.

Types and Uses of Estimates: Revised estimate, Supplementary estimate, Repair and maintenance estimate, renovation estimate.

Roles and responsibility of Estimator.

Checklist of items in load bearing and framed structure.

Standard formats of Measurement sheet, Abstract sheet, Face sheet.

Modes of measurement and desired accuracy in measurements for different items of work as per IS:1200.

Rules for deduction in different category of work as per IS:1200

Unit-II

Approximate Estimates:

Approximate estimate- Definition, Purpose.

Methods of approximate estimate - Service unit method, Plinth area rate method, Cubical content method, Typical bay method, Approximate quantity method (with simple numerical)

Approximate estimate for roads and water supply projects.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit-III

Detailed Estimate:

Detailed Estimate- Definition and Purpose, Data required for detailed estimate - Civil cost, GST, Supervision charges, Agency charges, Procedure for preparation of detailed estimate- Taking out quantities and Abstracting.

Methods of Detailed Estimate- Unit quantity method and total quantity method (with simple numerical)

Long wall and short wall method, Centre line method.

Bar bending schedule for footing, column, beam, Lintel, chajja and slab elements.

Provisions in detailed estimate: contingencies, work charged establishment, percentage charges, water supply and sanitary Charges and electrification charges.

Prime cost, Provisional sum, Provisional quantities, Bill of quantities, Spot items or Site items.

Unit-IV

Estimate for Civil Engineering Works:

Earthwork - Quantities for roads, Embankment and canal by – Mid sectional area method, mean sectional area method, Prismoidal and trapezoidal formula method. Detailed estimate for septic tank.

Unit-V

Unit – 5 Rate Analyses:

Rate Analysis: Definition, purpose and importance.

Lead (Standard and Extra), lift, overhead charges, water charges and contractor's profit.

Procedure for rate analysis.

Task work- Definition, types. Task work of different skilled labour for different items.

Categories of labours, their daily wages, types and number of labours for different items of work. Preparing rate analysis of different items of work pertaining to buildings.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Text Books / Reference:-

1. Estimating and Costing in Civil engineering B.N Dutta UBS Publishers Distributors Pvt. Ltd. New Delhi

2. Estimating and costing R.S. Majumdar FPH (Foundation Publishing House)

3. Estimating and costing Arun Kumar Gupta FPH (Foundation Publishing House)

4. Estimating and Costing S.C Rangwala Charotar Publishing House PVT. LTD., Anand.

5. Estimating and costing, specification and valuation in civil engineering M. Chakraborti, Monojit Chakraborti, Kolkata.

6. Estimating construction cost (fifth edition) L. Peurifoy, Robert Oberlender, Garold Mc Graw Hill Education, , New Delhi.

Course Outcomes:-

1. Prepare quantity estimates for Buildings, roads & rails and canal structures as per specifications.

2. Draft detailed specifications and work out Rate Analysis for all works related to civil engineering projects.

3. Ascertain the quantity of materials required for Civil engineering works as per specifications.

4. Prepare cost estimate and valuation of civil engineering works.

5. Prepare tenders & contract documents. Evaluate contracts and tenders in construction practice

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	Water Resources Engineering	DCEP503

Course Objectives: Following are the objectives of this course:

1. To learn estimation of hydrological parameters.

2. To understand water demand of crops and provisions to meet the same.

3. To know planning of reservoirs and dams.

4. To design irrigation projects, canals and other diversion works.

UNIT-1

Introduction to Hydrology

Hydrology: Definition and Hydrological cycle.

Rain Gauge: Symon's rain gauge, automatic rain gauge.

Methods of calculating average rainfall: Arithmetic mean, Isohyetal, and Theissen polygon method. Runoff, Factors affecting Run off, Computation of run off. Maximum Flood Discharge measurement: Rational and empirical methods, Simple numerical problems.

UNIT-II

Crop water requirement

Irrigation and its classification.

Crop Water requirement: Cropping seasons, Crop period, base period, Duty, Delta, CCA, GCA, intensity of irrigation, factors affecting duty, Problems on water requirement and capacity of canal.

Methods of application of irrigation water and its assessment.

Area capacity curve

UNIT-III

Dams and Spillways

Dams and its classification: Earthen dams and Gravity dams (masonry and concrete).

Earthen Dams – Components with function, typical cross section, seepage through embankment and foundation and its control.

Methods of construction of earthen dam, types of failure of earthen dam and preventive measures. Gravity Dams – Forces acting on dam, Theoretical and practical profile, typical cross section, drainage gallery, joints in gravity dam, concept of high dam and low dam.

Spillways-Definition, function, location, types and components, Energy dissipaters.

UNIT-IV

Minor and Micro Irrigation

Bandhara irrigation: Layout, components, construction and working, solid and open bandhara.

Percolation Tanks – Need, selection of site.

Lift irrigation Scheme-Components and their functions, Lay out.

Drip and Sprinkler Irrigation- Need, components and Layout.

UNIT-V

Diversion Head Works & Canals

Weirs – components, parts, types,

Diversion head works – Layout, components and their function.

Barrages – components and their functions. Difference between weir and Barrage.

Canals – Classification according to alignment and position in the canal network, Cross section of canal in embankment and cutting, partial embankment and cutting, balancing depth, Design of most economical canal section.

Canal lining - Purpose, material used and its properties, advantages. Cross Drainage works Aqueduct, siphon aqueduct, super passage, level crossing.

Canal regulators- Head regulator, Cross regulator, Escape, Falls and Outlets

Text / Reference Books:- Titles of the Book Name of Authors Name of the Publisher

1. Irrigation and Water Power Engineering B.C Punmia B. Pande, B Lal Laxmi Publications

2. Engineering Hydrology K. Subramanya McGraw Hill Education A

3. Applied Hydrology K.N Mutreja McGraw Hill Education Water Resources Engineering Piyush Goyal FPH (Foundation Publishing House)

4. Irrigation Engineering N.N Basak McGraw Hill Education and Hydraulic Structures S. K Garg Khanna Publishers, Delhi. Irrigation Engineering R.K Sharma T.K Sharma S Chand.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	Traffic Engineering	DCEPE504

Course Objectives:

1. Following are the objectives of this course:

2. To understand the issues involved in traffic flow.

3. To know and understand the tools for traffic studies.

4. To delineate various traffic control measures.

5. To understand measures for preventing accidents.

Unit – I

Fundamentals of Traffic Engineering

Traffic engineering- Definition, objects, scope

Relationship between speed, volume and density of traffic

Road user's characteristics-physical, mental, emotional factors.

Vehicular characteristics-width, length, height, weight, speed, efficiency of breaks.

Road characteristics - gradient, curve of a road, design speed, friction between road and tyre surface.

Reaction time - factors affecting reaction time. PIEV Theory.

Unit– II

Traffic Studies

Traffic volume count data- representation and analysis of data.

Necessity of Origin and Destination study and its methods.

Speed studies - Spot speed studies, and its presentation.

Need and method of parking study.

Unit– III

Road Signs and Traffic Markings

Traffic control devices –definition, necessity, types.

Road signs - definition, objects of road signs.

Classification as per IRC: 67-Mandatory or Regulatory, Cautionary or warning, informatory signs, Location of cautionary or warning sign in urban and non-urban areas, Points to be considered while designing and erecting road signs.

Traffic markings- definition, classification, carriage way, kerb, object marking and reflector markers.

Unit– IV

Traffic Signals and Traffic Islands

Traffic signals- Definition, Types, Traffic control signals, pedestrian signals.

Types of traffic control signals - Fixed time, manually operated, traffic actuated signals and location of signals.

Compute signal time by fix time cycle, Webster's and IRC method and sketch timing diagram for each phase.

Traffic islands –Definition, advantages and disadvantages of providing islands.

Types of traffic islands - rotary or central, channelizing or Refuge Island.

Road intersections or junctions - Definition, Types of road intersection.

Intersection at grade- Types, basic requirements of good intersection at grade.

Grade separated intersection- advantages and disadvantages, types - flyovers-partial and full Cloverleaf pattern, Diamond intersection, Trumpet type, underpass.

Unit– V

Road Accident Studies and Arboriculture

Road Accidents-Definition, types and causes for collision and non-collision accidents.

Measures to prevent road accidents.

Collision and condition diagram.

Street lighting –definition, necessity, types-luminaire, foot candle, lumen, factors affecting their utilization and maintenance.

Arboriculture- definition, objectives, factors affecting selection of type of trees.

Maintenance of trees-protection and care of road side trees.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Suggested learning resources:

1. Khanna S.K., Justo, C E G and Veeraragavan, A., Highway Engineering, Nem Chand and Brothers, Roorkee.

2. Kadiyali L.R., Transportation Engineering, Khanna Book Publishing Co., Delhi

3. Vazirani, V N, Chaondola, S P, Transportation Engineering Vol. I & II, Khanna Publishers, Delhi.

4. Saxena, S C, Traffic planning and design, Dhanpat Rai & Sons Delhi.

5. Kumar R S, Introduction to Traffic Engineering, University Press (India), Pvt. Ltd.

Course outcomes:

After completing this course, student will be able to:

1. Analyze road traffic characteristics.

2. Undertake various types of road traffic studies.

3. Use relevant road traffic signs, signal and markings.

4. Identify the intersection depending on the traffic flow.

5. Suggest preventive measures to avoid accidents by analyzing the traffic conditions at site.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	**Solid Waste Management**	DCEPE505

Course Objectives: Following are the objectives of this course:

1. To know various sources of solid.

2. To learn techniques of collection and transportation of solid waste.

3. To know various methods of disposal of solid waste.

4. To understand and identify different biomedical and E-waste and their subsequent disposal Techniques.

Course Content:

Unit – I Introduction

Definition of solid waste, different solid waste – domestic Waste, commercial waste, industrial waste, market waste, agricultural waste, biomedical waste, E-waste, hazardous waste, institutional waste, etc.

Sources of solid waste, Classification of solid waste – hazardous and non- hazardous waste.

Physical and chemical characteristics of municipal solid waste.

Unit– II Storage, Collection and Transportation of Municipal Solid Waste

Collection, segregation, storage and transportation of solid waste.

Tools and Equipment-Litter Bin, Broom, Shovels, Handcarts, Mechanical road sweepers,

Community bin - like movable and stationary bin.

Transportation vehicles with their working capacity -Animal carts, Auto vehicles, Tractors

or Trailers, Trucks, Dumpers, Compactor vehicles. Transfer station- meaning, necessity, location.

Role of rag pickers and their utility for society.

Unit– III Composting of Solid Waste

Concept of composting of waste, Principles of composting process. Factors affecting the composting process.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Methods of composting – Manual Composting – Bangalore method, Indore Method, Mechanical

Composting – Dano Process, Vermi composting.

Unit IV Techniques for Disposal of Solid Waste

Solid waste management techniques – solid waste management hierarchy, waste prevention

And waste reduction techniques, Land filling technique, Factors to be considered for site selection, Land filling methods-Area method, Trench method and Ramp method, Leachate and its control, Biogas from landfill, and disadvantages of landfill method, Recycling of municipal solid waste, Incineration of waste: Introduction of incineration process, Types of incinerators - Flash, Multiple chamber Incinerators, Products of incineration process with their use, Pyrolysis of waste – Definition, Methods 113 Civil Engineering Curriculum Structure.

Unit– V Biomedical and E-waste management

Definition of Bio medical Waste

Sources and generation of Biomedical Waste and its classification

Bio medical waste Management technologies

Definition, varieties and ill effects of E- waste,

Recycling and disposal of E- waste.

Book/References:-

1. Gupta O.P, Elements of Solid Hazardous Waste Management, Khanna Book Publishing Co., Delhi Ed. 2018.

2. Bhide, A. D., Solid Waste Management, Indian National Scientific Documentation Centre, New Delhi.

3. George Techobanoglous, Kreith, Frank., Solid Waste, McGraw Hill Publication, New Delhi.

4. Sasikumar, K., Solid Waste Management, PHI learning, Delhi.

5. Hosetti, B.B., Prospect and Perspectives of Solid Waste Management, New Age International Publisher.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Course outcomes: After competing this course, student will be able to:

1. Identify the sources of solid waste.

2. Select the relevant method of collection and transportation of solid waste.

3. Suggest an action plan for composting of solid waste.

4. Devise suitable disposal technique for solid waste

5. Use the relevant method for disposal of Bio-medical and E-waste.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	**Advanced Construction Technology**	DCEPE506

Course Objectives: Following are the objectives of this course:

1. To gain knowledge on different materials in advanced construction
2. To know different methods in concreting.
3. To know the relevance of advanced construction methods for particular site condition.
4. To identify the requisite hoisting and conveying machinery for the given situation.

Course Content:

Unit – I Advanced Construction Materials

Fibres: Use and properties of steel, polypropylene, carbon and glass fibres.

Plastics: Use and properties of PVC, RPVC, HDPE, FRP, GRP.

Miscellaneous Materials: Properties and uses of acoustics materials, wall claddings, plaster boards, micro-silica, waterproofing materials, adhesives.

Civil Engineering Curriculum Structure 114

Use of waste products and industrial by products in bricks, blocks, concrete and mortar.

Unit– II Advanced Concreting Methods and Equipment

Ready Mix Concrete: Necessity and use of ready mix concrete. Products and equipment for ready mix concrete plant. Conveying of ready mix concrete, transit mixers.

Vibrators for concrete consolidation: Internal, needle, surface, platform and form vibrators.

Underwater Concreting: Procedure and equipments required for Tremie method, Drop bucket method. Properties, workability and water cement ratio of the concrete.

Special concrete: procedure and uses of special concretes: Roller compacted concrete, Self-compacting concrete (SCC), Steel fibre reinforced concrete, Foam concrete, shotcreting.

Unit– III Advanced Technology in Constructions

Construction of bridges and flyovers: Equipment and machineries required for foundation and super structure.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Construction of multi-storeyed Building: Equipments and machinery required for construction of multi-storeyed building such as use of lifts, belt conveyers, pumping of concrete. Prefabricated construction: Methods of prefabrication, Plant fabrication and site fabrication. All prefabricated building elements such as wall panels, slab panels, beams, columns, door and window frames etc. Equipments and machineries used for placing and Jointing of prefabricated elements.

Strengthening of embankments by soil reinforcing techniques using geo-synthetics

Unit– IV Hoisting and Conveying Equipments

Hoisting Equipments: Principles and working of Derrick-Pole, Gin Pole, Crane, Power driven scotch derrick crane, Hand operated crane, Locomotive crane, Tower crane, Lattice Girder, Winches, Elevators, ladders. Crawler cranes, Truck mounted cranes, Gantry cranes, Mast cranes.

Conveying Equipments: Working of belt conveyers, types of belts and conveying mechanism. Capacity and use of dumpers, tractors and trucks.

Unit– V Miscellaneous Machineries and Equipments

Excavation Equipment: Use, working and output of following machinery – bull dozers, scrapers, graders, Clam Shell, trenching equipment, Tunnel boring machine, Wheel mounted belt loaders, power shovels, JCB, and drag lines.

Compacting Equipment: Output of different types of rollers such as plain rollers, ship footed rollers, vibratory, pneumatic rollers rammers.

Miscellaneous Equipment: Working and selection of equipment: Pile driving equipment, Pile hammers, Hot mix bitumen plant, bitumen paver, grouting equipment, guniting equipment, floor polishing and cutting machine selection of drilling pattern for blasting, Bentonite/ mud slurry in drilling, Explosives for blasting, Dynamite, process of using explosives.

Books/References:

1. Sharma S C and Deodhar S V, Construction Engineering and Management, Khanna Book Publishing, New Delhi
2. Chudly, R., Construction Technology Vol. I to II, ELBS-Longman Group.
3. Peurifoy, R. L., Construction Planning Equipment and Methods, McGraw Hill Co. Ltd. New York.
4. 115 Civil Engineering Curriculum Structure

5. Seetharaman, S., Construction Engineering and Management, Umesh Publication, New Delhi.

6. Sengupta, B. and Guha., Construction Management and Planning, McGraw Hill Education, New Delhi.

7. Smith, R. C., Materials of Construction, McGraw Hill Co. Ltd.

8. Satyanarayana, R Saxena, S. C., Construction Planning and Equipment, Standard Publication, New Delhi.

9. Rangawala,S. C., Construction of Structures and Management of works, Charotar Publication, Anand.

10. Ghose, D. N., Materials of Construction, McGraw Hill Publishing Co, New Delhi.

Course outcomes: After completing this course, student will be able to:

1. Use relevant materials in advanced construction of structures.

2. Use relevant method of concreting and equipment according to type of construction.

3. Apply advanced construction methods for given site condition.

4. Select suitable hoisting and conveying equipment for a given situation.

5. Identify advanced equipment required for a particular site condition.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	Green Building and Energy Conservation	DCEPE508

Course Objectives: Following are the objectives of this course:

1. To know various aspects of green buildings
2. To use different steps involved in measuring environmental impact assessment.
3. To relate the construction of green building with prevailing energy conservation policy and regulations.
4. To know and identify different green building construction materials.
5. To learn different rating systems and their criteria.

Course Content:

Unit I: Introduction to Green Building and Design Features

Definition of Green Building, Benefits of Green building, Components/features of Green Building, Site selection, Energy Efficiency, Water efficiency, Material Efficiency, Indoor Air Quality.

Site selection strategies, Landscaping, building form, orientation, building envelope and fenestration, material and construction techniques, roofs, walls, fenestration and shaded finishes, advanced passive heating and cooling techniques, waste reduction during construction

Unit–II Energy Audit and Environmental Impact Assessment (EIA)

Energy Audit: Meaning, Necessity, Procedures, Types, Energy Management Programs

Environmental Impact Assessment (EIA): Introduction, EIA regulations, Steps in environmental.

Impact assessment process, Benefits of EIA, Limitations of EIA, Environmental clearance for the civil engineering projects.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit– III Energy and Energy conservation

Renewable Energy Resources: Solar Energy, Wind Energy, Ocean Energy, Hydro Energy, Biomass Energy

Non-renewable Energy Resources: Coal, Petroleum, Natural Gas, Nuclear Energy, Chemical Sources of Energy, Fuel Cells, Hydrogen, Biofuels.

Energy conservation: Introduction, Specific objectives, present scenario, Need of energy conservation, LEED India Rating System and Energy Efficiency.

Unit– IV Green Building

Introduction: Definition of Green building, Benefits of Green building,

Principles: Principles and planning of Green building

Features: Salient features of Green Building, Environmental design (ED) strategies for building construction.

Process: Improvement in environmental quality in civil structure

Civil Engineering Curriculum Structure 118

Materials: Green building materials and products- Bamboo, Rice husk ash concrete, plastic bricks, Bagasse particle board, Insulated concrete forms. reuse of waste material-Plastic, rubber, Newspaper wood, Nontoxic paint, Green roofing

Unit V Rating System

Introduction to (LEED) criteria,

Indian Green Building council (IGBC) Green rating,

Green Rating for Integrated Habitat Assessment. (GRIHA) criteria

Heating Ventilation Air Conditioning (HVAC) unit in green Building

Functions of Government organization working for Energy conservation and Audit (ECA)-

National Productivity council (NPC)

Ministry of New and Renewable *Energy* (MNRE)

Bureau of Energy efficiency (BEE)

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Books/References:-

1. Kibert, C.J., Sustainable construction: Green Building design and Delivery, John Wiley Hobo�- ken, New Jersey.

2. Chauhan, D S Sreevasthava, S K., Non-conventional Energy Resources, New Age International Publishers, New Delhi.

3. O.P. Gupta, Energy Technology, Khanna Publishing House, New Delhi

4. Jagadeesh, K S, Reddy Venkatta Rama & Nanjunda Rao, K S., Alternative Building Materials and Technologies, New Age International Publishers, Delhi.

6. Sam Kubba., Handbook of Green Building Design and Construction, Butterworth-Heinemann.

7. Means R S, Green Building - Project Planning and Cost Estimating, John Wiley & Sons

8. Sharma K V, Venkataseshaiah P., Energy Management and Conservation, IK International.

Course outcomes: After completing this course, student will be able to:

1. Identify various requirements for green building.

2. Use different steps in environmental impact assessment.

3. Relate the construction of green building with prevailing energy conservation policy and regulations.

4. Supervise the construction of green building construction using green materials.

5. Focus on criteria related to particular rating system for assessment of particular Green building

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	Pavement Design and Maintenance	DCEPE507

Course Objectives: - Following are the objectives of this course:

1. To know types of pavements and their uses.
2. To learn issues in design of flexible and rigid pavements.
3. To understand methods of pavement evaluation.
4. To learn pavement maintenance methods.

Course Content:

Unit – I Basics of pavement Design

Types of pavement - Flexible, Rigid and Semi Rigid

Comparison of Rigid and flexible pavement according to Design precision, life maintenance, initial cost, stages of construction, availability of materials, surface characteristic, and penetration of water in the pavement, utility location, glare and night visibility.

Functions and characteristics of pavement.

Factors affecting selection of type of pavement.

Unit– II Fundamentals of pavement design

Factors affecting pavement design-design wheel load ,Traffic factors, Environmental factors, Road geometry and material, Characteristics of soil and Drainage situation. Civil Engineering Curriculum Structure 116

Unit– III Design overview of Flexible and Concrete pavement

Methods of flexible pavement design-Theoretical method, Empirical method with and without soil strength test.

IRC37 guidelines for design of flexible pavement (overview only)

Factors affecting design of concrete pavement.

IRC58 guidelines for design of concrete pavement (overview only)

Joints-Need, Types, requirements, spacing of joints

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit– IV Pavement evaluation

Definition and purpose of pavement evaluation

Methods of Pavement evaluation –Visual rating, Pavement serviceability index, Roughness measurements, Benkelman Beam deflection method

Unit V - Pavement Maintenance

Types of pavement maintenance - routine, periodic, and special. Need for inspection and maintenance schedule. Causes of pavement failure and remedial measures. Typical flexible and rigid pavement failures.

Types and causes of damages in flexible pavement, surface defects, cracks. Deformations Rutting, fatigue, settlement and upheaval. Disintegration- loss of aggregate, stripping, pothole.

Remedial measures - slurry seal, liquid seal, fog seal, patching, ready mix patch.

Types of damages to rigid pavement - cracking, spalling, slab rocking, settlement, joint sealant failure. Methods of repair - repair of spalled joints, full depth reconstruction, replacement of dowel bars.

Books/References:-

1. Kadiyali, L.R., Highway Engineering, Khanna Book Publishing House, New Delhi (ISBN: 978-93-86173-133)

1. Chakroborty, Partha Das, Animesh., Principles of Transportation engineering, Prentice-Hall of India Pvt.Ltd

2. Vazirani, V N, Chaondola, S P., Transportation Engineering Vol. I & II, Khanna Publishers. Delhi

3. Yoder, E J, Principles of Pavement Design, Wiley India Pvt Ltd.

4. Bindra, S P., Highway Engineering, Dhanpat Rai Publications (P) Ltd

5. Kumar R S, Pavement Evaluation and Maintenance Management system, University Press (India), Pvt. Ltd.

6. Sharma S K, Principles, Practice and Design of Highway Engineering, S Chand, New Delhi.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Course outcomes:

After completing this course, student will be able to:

1. Identify the components of the given type of pavement.

2. Suggest the type of pavement for the given situation.

3. Design the flexible pavement using the provisions of IRC

4. Design the concrete pavement using the provisions of IRC

5. Decide type of maintenance required under different damaged conditions

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	Building Services and Maintenance	DCEPE509

Course Objectives:-Following are the objectives of this course:

1. To know the procedure for classifying various types of building services.
2. To know the fire safety requirements for multi-storeyed building.
3. To devise suitable plumbing system for given type of building.
4. To understand the procedure for rain water harvesting and solar water heater.
5. To know the system for designing lighting, ventilation and acoustics for any building.

Course Content:

Unit – I Overview of Building Services

Introduction to building services, Classification of buildings as per National Building code, Necessity of building services, Functional requirements of building, Different types of building services i.e. HVAC (Heat, Ventilation and Air Conditioning), Escalators and lifts, fire safety, protection and control, plumbing services, rain water harvesting, solar water heating system, lighting, acoustics, sound insulation and electric installation etc.

Role and responsibility of Building Service Engineer, Introduction to BMS (Building Management Services), Role of BMS, concept of smart building.

Unit– II Modes of vertical communication

Objectives and modes of vertical communication in building.

Lifts**:** Different types of lifts and its uses, Component parts of Lift- Lift Well, Travel, Pit, Hoist Way, Machine, Buffer, Door Locks, Suspended Rope, Lift Car, Landing Door, Call Indicators, Call Push etc., Design provisions for basic size calculation of space enclosure to accommodate lift services, Safety measures.

Escalators**:** Different Types of Escalators and its Uses, Components of escalators, Design provisions for basic size calculation of space enclosure to accommodate escalator services, Safety measures.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Ramp: Necessity, design consideration, gradient calculation, layout and Special features required for physically handicapped and elderly.

Unit– III Fire Safety

Fire protection requirements for multi-storied building, causes of fire in building, Fire detecting and various extinguishing systems, Working principles of various fire protection systems.

Safety against fire in residential and public buildings (multi-storied building), National Building Code provision for fire safety, Fire resisting materials and their properties, Fire resistant construction, procedures for carrying out fire safety inspections of existing buildings, Provisions for evacuation.

Unit– IV Plumbing Services

Importance of plumbing, AHJ (Authority Having Jurisdiction) approval, Plumbing Terminology and fixtures: Terms used in plumbing, Different types of plumbing fixtures, shapes/ sizes, capacities, situation and usage, Traps, Interceptors.

System of plumbing for building water supply: storage of water, hot and cold water supply system.

System of plumbing for building drainage: Types of drainage system such as two pipe system, one pipe system, types of Vents and purpose of venting, Concept of grey water and reclaimed water.

Civil Engineering Curriculum Structure 120

Different pipe materials, and jointing methods, fittings, hanger, supports and valves used in plumbing and their suitability.

Unit– V Lighting, Ventilation and Acoustics

Concept of SWH (Solar water heating), component parts of SWH, various system of SWH (heat transfer, propulsion, passive direct system, active direct system, Do-it-yourself), installation and maintenance.

Concept of lighting, types of lighting (natural and artificial), factors influencing the brightness of room, factors affecting selection of artificial lighting, installation of light (direct, half-direct, indirect, half-indirect and direct-indirect), types of light control (manual switch, remote switch, timer switch and photo-electric cell switch), types of lamps (incandescent, tungsten halogen and electric discharge), Lamp selection as per room sizes.

Concept of ventilation, necessity and Types of ventilation.

Building Acoustic, Objectives, acoustic Control in a building, acoustic material (porous absorber and cavity resonator)

Books/ References:-

1. Patil, S. M., Building Services, Seema Publication, Mumbai.
2. Mantri and Sandeep., The A to Z of Practical Building Construction and its Management, Satya Prakashan, New Delhi**.**
3. Bag S P, Fire Services in India: History, Detection, Protection, Management, Mittal Publications, New Delhi.
4. Deolalikar,S. G., Plumbing Design and Practice, McGraw-Hill,
5. Akhil Kumar Das., Principles of Fire Safety Engineering: Understanding Fire and Fire Protection, PHI Learning Pvt. Ltd, New Delhi.
6. Shraman N L, Solar panel installation guide & user manual**,** The Memory Guru of India.
7. Gupta M K, Practical handbook on building maintenance - Civil works, Nabhi Publications.
8. BIS., National Building Code Part1, 4, 8, 9., Bureau of Indian Standard, New Delhi
9. BIS., IS 12183(Part 1):1987 Code of practice for plumbing in multistoried buildings., Bureau of Indian Standard, New Delhi.
10. BIS., 2008 Uniform plumbing code – India (UPC-I)., Bureau of Indian Standard

Course outcomes: After completing this course, student will be able to:

1. Classify various types of building services as per functional requirements.
2. Propose the fire safety requirements for multi-storeyed building.
3. Devise suitable water supply and sanitation system for given type of building.
4. Evaluate the potential of rain water harvesting and solar water heater system for the given type of building.
5. Justify the necessity of designing the system of lighting, ventilation and acoustics for the given type of building.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	Industrial Instrumentation	DCEOE510

COURSE OBJECTIVES:-

1. 1 To introduce the measurement techniques of force, torque and sped.
2. To introduce the measurement techniques of acceleration, Vibration and density.
3. To introduce the measurement Viscosity, Humidity and moisture.
4. To introduce the temperature measurement techniques.
5. To introduce the pressure measurement techniques.

UNIT I

MEASUREMENT OF FORCE, TORQUE AND SPEED

Load Cell introduction, Different types of load cells: Hydraulic, Pneumatic, Strain gauge, Magneto-elastic and Piezoelectric load cells – Different methods of torque measurement: Strain gauge, Relative angular twist. Speed measurement: Capacitive tacho, Drag cup type tacho, D.C and A.C tacho generators – Stroboscope.

UNIT II

MEASUREMENT OF ACCELERATION, VIBRATION AND DENSITY

Accelerometers: LVDT, Piezoelectric, Strain gauge and Variable reluctance type accelerometers – Mechanical type vibration instruments – Seismic instruments as accelerometer – Vibration sensor –– Units of density and specific gravity: Pressure type densitometers, Float type densitometers, Ultrasonic densitometer and gas densitometer.

UNIT III

MEASUREMENT OF VISCOSITY, HUMIDITY AND MOISTURE

Viscosity: Say bolt viscometer – Rotameter type and Torque type viscometers – Consistency Meters – Humidity: Dry and wet bulb psychrometers – Resistive and capacitive type hygrometers – Dew cell – Commercial type dew meter. Moisture: Different methods of moisture measurements –Thermal, Conductivity and Capacitive sensors, Microwave, IR and NMR sensors, Application of moisture measurement – Moisture measurement in solids.

RKDF UNIVERSITY RANCHI
DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT IV

TEMPERATURE   **MEASUREMENT**

Definitions and standards – Primary and secondary fixed points – Different types of filed in system thermometers – Sources of errors in filed in systems and their compensation – Bimetallic thermometers – IC sensors – Thermocouples: Laws of thermocouple, Fabrication of industrial thermocouples, Reference junctions compensation, – Radiation fundamentals – Radiation methods of temperature measurement – Total radiation pyrometers – Optical pyrometers – Two colour radiation pyrometers – Fibre optic sensor for temperature measurement – Thermograph, Temperature switches and thermostats – Temperature sensor selection, Installation and Calibration.

UNIT V

PRESSURE   **MEASUREMENT**

Units of pressure – Manometers: Different types, Elastic type pressure gauges: Bourdon tube, Bellows, Diaphragms and Capsules – Electrical methods: Elastic elements with LVDT and strain gauges – Capacitive type pressure gauge – Piezo resistive pressure sensor-Resonator pressure sensor – Measurement of vacuum: McLeod gauge, Thermal conductivity gauge, lionization gauges, Cold cathode type and hot cathode type – Pressure gauge selection, installation and calibration using dead weight ester.

Course outcomes:

After studying this course students will be able to

1. Describe the basic principle of transducers

2. Applications of transducers in real world

3. Measurement, calibration and signal conditioning of transducers.

New Scheme Based on AICTE Flexible Curricula

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Semester – V

Branch	Subject Title	Subject Code
CE	Web Technology	DCEOE511

Objectives: Giving the students the insights of the Internet programming and how to design and implement complete applications over the web.

Unit-I

Internet Fundamentals :Motivation for internetworking History and scope of internet protocol and standardization 1.4 Role of ISP & Factors for choosing an ISP 1.5 Internet Service providers in India 1.6 Types of connectivity such as Dial Up, Leased, VSAT etc. 1.7 Internet server and client modules on various operating system

Unit-II

TCP/ IP : 2.1 TCP/IP internet layering model 2.2 Reliable stream transport service (TCP) 2.3 Need for stream delivery 2.4 Properties of reliable delivery service 2.5 Providing reliability 2.6 Idea behind slide windows 2.7 Ports connection and end points Segment, stream, sequence number 2.8 TCP segment format, TCP header.

Unit-III

Internet Application and Services: 3.1 Email 3.2 Email networks 3.3 Email protocols 3.4 Format of an email address 3.5 Email routing 3.6 Email clients, POP3, IMAP 3.7 FTP 3.8 Public domain software 3.9 Types of FTP servers 3.10 FTP clients 3.11 Telnet 3.12 Telnet protocols 3.13 Server domain 3.14 Telnet clients 3.15 Terminal emulation 3.16 Internet Relay Chat 3.17 IRC network and servers 3.18 Channels

Unit-IV

E-Commerce: 4.1 Introduction to Electronic commerce 4.2 Modes of electronic commerce 4.3 Electronic data interchange 4.4 Migration to OPEN EDI 4.5 Electronic commerce with www/Internet 4.6 Different types of Electronics Payment System Credit card, Debit card, Smart Card, E-Cash, E-Wallet

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit-V

Web Publishing and Browsing: 5.1 Overview, SGML, HTML 5.2 Web hosting 5.3 CGL, Documents Interchange Standards 5.4 Components of Web Publishing, Document management

5.5 Web Page Design, Consideration and Principles 5.6 Search and Meta Search Engines 5.7 WWW, Browser, HTTP, Publishing Tools

Unit-VI

Interactivity Tools: CGI, XML, ActiveX, VB Script, JAVA Script, Front Page, Adobe Dreamweaver, Flash

References

1. Internet working with TCP/IP VOl-1: Principles Protocol and Architecture by-Douglas EComer –PHI

2. Internet working with TCP/IP VOL-2 : Design , Implementation and Internals by-Douglas E Comer, David L. Stevens- PHI

3. HTML: the Definitive guide –lby Chuck Musciano & Bui Kennedy4

4. Learning PHP, MySQL & JavaScript with jQuery, CSS & HTML5 by Robin Nixon

Course outcomes:-

1. Analyze a web page and identify its elements and attributes.
2. Create web pages using XHTML and Cascading Style Sheets.
3. Build dynamic web pages using JavaScript (Client side programming).
4. Create XML documents and Schemas.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – V

Branch	Subject Title	Subject Code
CE	Power Plant Engineering	DCEOE512

Course Objective:

i. To introduce students to different aspects of power plant engineering.

ii. To familiarize the students to the working of power plants based on different fuels.

iii. To expose the students to the principles of safety and environmental issues.

UNIT I

INTRODUCTION & ECONOMICS OF POWER PLANT

Power plant-Introduction, Classification - Location of power plant- Choice of Power plant Terminology used in power plant: Peak load, Base load, Load factor, Load curve, demand factor- Various factor affecting the operation of power plant- Load sharing- cost of power tariff methods- factors involved in fixing of a tariff.

UNIT II

HYDRO POWER PLANT

Hydroelectric power plant- Introduction, storage and poundage, Selection of sites for hydroelectric power plant-General layout and essential elements of Hydroelectric power plant and its working- Classification of the plant- base load plant, peak load plant, Run off river plant, storage river plant, pumped storage plant, mini and micro hydel plants, governing of hydraulic turbines-impulse turbine- reaction turbine, selection of turbines, Advantages and disadvantages-limitations of hydroelectric power plant.

UNIT III

THERMAL POWER PLANT

Thermal power plant -General layout, working, Site Selection, materials required for thermal powerplants, coal handling and its methods, stages in coal storage, Fuel burning-Stoker firing, overfeed stoker, under feed stokers, chain grate stoker, Pulverized fuel handling system-unit and central system, Pulverization of coal-Ball mill, Ash handling system, Gravity system, electrostatic precipitation (ESP) system, Feed water treatment- Mechanical method,

Advantages and disadvantages and limitations of Thermal power plant.

UNIT IV

NUCLEAR POWER PLANT & GAS TURBINE POWER PLANTS

Nuclear power plant-introduction-nuclear fuels, nuclear fission and fusion, working of a nuclear power plant, types of reactors- pressurized water reactor- boiling water reactor, effects of nuclear radiation, different methods for nuclear waste disposal-low, medium and high level waste disposal, Advantages -disadvantages- limitations. Gas turbine power plant- Schematic diagram & working of open and closed cycle gas turbine power plant, Components of Gas turbine–compressor, combustion chamber, gas turbine, gas turbine fuels, Advantages - disadvantages- limitations of Gas turbine powerplant

UNIT V

SOLAR, WIND AND DIESEL POWER PLANTS

Solar power plant-introduction, layout, Solar cell fundamentals & classification – maximum power point tracker (MPPT) and solar panel.

Wind power plant: introduction, Factors affecting distribution of Wind energy, Variation of wind speed with height and time-Horizontal axis wind turbine (HAWT)-types of rotors Vertical axis wind turbine- types of rotors- Wind energy conversion system (WECS) advantages and disadvantages-limitations of Wind power plant.

Diesel power plant - layout, Components and working- Advantages – disadvantages, limitations.

UNIT VI

PLANT SAFETY AND ENVIRONMENTAL IMPACT OF POWER PLANT

Social and Economic issues of power plant- Oxides of sculpture, oxides of carbon, oxides of nitrogen, Acid precipitation-Acid rain- acid snow- Dry deposition-acid fog, greenhouse effect, air and water pollution from thermal power plants and its control, Thermal pollution from thermal power plants, noise pollution and its control, natural and artificial radioactivity nuclear power and environment- radiations from nuclear power plant effluents- high level wastes- methods to reduce pollution, global warming- its effects and control, standardization for environmental pollution.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Reference Books:

1. Power Plant Engineering" Mahesh Verma, Metropolitan Book Company Pvt. Ltd. New Delhi

2. "Power Plant Technology" El-Vakil, McGraw Hill.

3. Power Plant Engineering by P.K. Nag, Tata McGraw Hill.

4. Steam & Gas Turbines & Power Plant Engineering by R.Yadav, Central Pub.House.

Course Outcomes:

At the end of the course, a student will be able to:

1. Describe and analyze different types of sources and mathematical expressions related to thermodynamics and various terms and factors involved with power plant operation.

2. Analyze the working and layout of steam power plants and the different systems comprising the plant and discuss about its economic and safety impacts

3. Combine concepts of previously learnt courses to define the working principle of diesel power plant, its layout, safety principles and compare it with plants of other types.

4. Describe the working principle and basic components of the nuclear power plant and the economic and safety principles involved with it.

5. Discuss the working principle and basic components of the hydroelectric plants and the economic principles and safety precautions involved with it

6. Discuss and analyze the mathematical and working principles of different electrical equipments involved in the generation of power

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
Credit System and Marks Distribution:-

								Periods		Credits	Marks Distribution				

Semester-VI

SL. No.	Category	Subject Code	Subject Name	L	T	P	Credits	Internal Max	External Max	External Min	Total Max	Total Min
1	PCC	DCEP601	Design of RCC Structure	3	1	0	3	30	70	21	100	35
2	PCC	DCEP602	Environmental Engineering	3	0	0	3	30	70	21	100	35
3	Huminities & social Sc. Course	DCEH603	Entrepreneurship	3	0	0	3	30	70	21	100	35
4	OEC		Open Elective-II	3	0	0	3	30	70	21	100	35
5	OEC		Open Elective-III	3	0	0	3	30	70	21	100	35
6	Mendatory course	DCEP606	Environmental Science	0	0	0	0	30	70	21	100	35
PRACTICAL DEMONSTRATION												
1	PCC	DCEP652	Environmental Engineering Lab	0	0	2	1					
2	PCC	DCE653	Auto Cad	0	0	2	1					
3	PROJ	DE654	Major Project	0	0	8	4				50	25
4	SEM	DE655	Seminar	0	0	2	1				50	25
TOTAL							**22**					

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Elective Papers for semester-VI

SL. No.	Category	Subject Code	Subject Name	Periods			Credits	Marks Distribution				
				L	T	P		Internal	External		Total	
								Max	Max	Min	Max	Min
Open Elective-II (Choose any one)												
1	OEC	DCEOE604	Disaster Management	3	0	0	3	30	70	21	100	35
2	OEC	DCEOE605	Geo-informatics	3	0	0	3	30	70	21	100	35
3	OEC	DCEOE606	Contracts and Accounts	3	0	0	3	30	70	21	100	35
Open Elective-III (Choose any one)												
1	OEC	DCEOE607	Robotics	3	0	0	3	30	70	21	100	35
2	OEC	DCEOE608	PLC & SCADA	3	0	0	3	30	70	21	100	35
3	OEC	DCEOE609	Introduction To Artificial Intelligence	3	0	0	3	30	70	21	100	35

SESSION 2023 ONWARDS

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – VI

Branch	Subject Title	Subject Code
CE	Contracts and Accounts	DCEOE606

Course Objective:

1. **Impart the knowledge of Estimating, Costing and Valuation for Civil Engineering Structures.**

2. **Prepare and evaluate contract documents**

Unit –I

Procedure of execution of work by P.W.D- Organizational structure of P.W.D., functions of their personnel, P.W.D. Procedure of initiating the work, administrative approval, technical sanction, budget provision, Methods used in P.W.D., For carrying out works contract, method and departmental method, rate list method, piece work method, day's work method, department method (NMR and Casual MusterRoll.)

Unit – II

Contract-Definition of contract, Objects of contract, requirements of valid contract, Types of engineering contract with advantages and disadvantages their suitability- Lump sum contract, item rate contract, percentage rate contract, cost plus percentage, cost plus fixed fee, cost plus variable percentage and cost plus variable fee contract, labor contract, demolition contract, target contract, negotiated contract, Class of contractor, Registration of contractor, BOT Project: objectives, scope, advantages, disadvantages, examples. Tender &Tender Documents- Definition of tender, necessity of tender, types- local and global, tender notice, points to be included while drafting tender notice, drafting of tender notice, Meaning of terms: earnest money, security deposit, validity period, right to reject one or all tenders, corrigendum to tender notice and its necessity, Tender documents–list, schedule-a, schedule-b ,schedule-C, Terms related to tender documents–contract conditions: time limit, time extension, penalty, defective material and workmanship, termination of contract, suspension of work, subletting of contract, extra items ,escalation ,arbitration, price variation clause, defect liability period, liquidated and unliquidated damages, Filling the tender by contractor and points to be

observed by him, Procedure of submitting filled in tender document, procedure of opening tender , comparative statement , scrutiny of tenders, award of contract, acceptance letter and work order, Unbalanced tender, ring formation.

Unit-III

Accounts in P.W.D- Various account forms and their uses- measurement books, nominal muster roll, imp rest cash, indent, invoice, bills, vouchers, cash book, temporary advance. Payment to Contractors- Mode of payment to the contractor- interim payment and its necessity, advance payment, secured advance, on account payment, final payment, first and final payment, retention money, reduced rate payment, petty advance, mobilization advances.

Unit- IV

Specification-Necessity and importance of specifications of items, points to be observed in framing specifications of an item, types of specification –brief and detailed, and standard and manufacturer's specification, preparing detailed specifications of items in civil engineering works. from each of following: building construction system, irrigation engineering system, transportation engineering system, environmental engineering system, legal aspects of specification, definition, necessity of valuation. Definitions–cost, price, value, characteristics of value, factors affecting value, types of value: book value, scrap value, salvage value, speculative value, distress value, market value, monopoly value, sentimental value, factors affecting value. depreciation, obsolescence, sinking fund, methods of calculation of depreciation– straight line method, sinking fund method, constant percentage method quantity survey method, computation of capitalized value, gross income, outgoing, net income, years purchase. Types of outgoing, and their percentages, fixation of rent as per P.W.D. Practice.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Reference books:

1. Estimation And Costing, B.N. Datta, UBS Publishers

2. Estimating &Costing, S.C. Rangwala, Charotar Publication

3. ESTIMATING &COSTING, G. S. Birdie, Dhanpat Rai and Sons.

COURSE OUTCOMES:-

1. Execute the method of PWD for initiating the works.

2. Execute the contract for civil engineering works.

3. Prepare the tender documents for civil engineering work.

4. Use the relevant type of form used in PWD to pay the bill of the executed work

5. Prepare the detailed specification for various items of construction.

6. Justify the rent fixation of civil structures.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – VI

Branch	Subject Title	Subject Code
CE	Environmental Engineering	DCEP602

Course Objective:-

Be successfully employed or employable in environmental engineering practice in areas such as solid waste, air pollution, water and wastewater treatment, water resources, or related fields and/or be continuing their studies at the graduate level.

UNIT-1

Water supply engineering; Sources of supply, yields, introduction to intakes and conductors; Estimation of demand; Water quality standards; Control of Water-borne diseases; Primary and secondary treatment, detailing and maintenance of treatment units; Conveyance and distribution systems of treated water, leakages and control; Rural water supply; Institutional and industrial water supply.

UNIT-2

Waste Water Engineering; Urban rain water disposal; Systems of sewage collection and disposal; introduction to Design of sewers and sewerage systems; pumping; Characteristics of sewage and its treatment, Disposal of products of sewage treatment, stream flow rejuvenation Institutional and industrial sewage management; Plumbing Systems; Rural and semi-urban sanitation..

UNIT-3

Solid Waste Management; Sources, classification, collection and disposal; introduction and Management of landfills, Hazardous Wastes Introduction, types of hazardous wastes, Characteristics of hazardous wastes, treatment and disposal of hazardous wastes

UNIT-4

Air And Noise Pollution and Ecology; Sources and effects of air pollution, monitoring of air pollution; Noise pollution and standards; Ecological chain and balance, Environmental assessment

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Books/References

1. Environmental Engineering (Volume I&II), S. Garg, Khanna Publishers,

2. Environmental Engineering,N.N. Basak, TMH

3. Water Supply and Sanitary Engg. Birdie G.S, Birdie J.S. Dhanpat Rai & Sons

List of practical's to be performed (Any Eight):

1. Determine pH value of given sample of water.

2. Determine the turbidity of the given sample of water.

3. Determine residual chlorine in a given sample of water.

4. Determine suspended, dissolved solids and total solids of given sample of water.

5. Determine the dissolved oxygen in a sample of water.

6. Determine the optimum dose of coagulant in a given raw water sample by jar test.

7. Draw sketches of various valves used in water supply pipe line

8. Draw a sketch of one pipe and two pipe system of plumbing

9. Determine B.O.D. of given sample of sewage.

10. Determine C.O.D. of given sample of sewage.

11. Determine pH value of given sample of sewage.

12. Undertake a field visit to water treatment plant and prepare a report.

13. Prepare a report of a field visit to sewage treatment plant

Course Outcomes:-

1. The students will gain an experience in the implementation of environmental Engineering on engineering concepts which are applied in field.

2. The students will get a diverse knowledge of environmental engineering practices applied to real life problems.

3. The students will learn to understand the theoretical and practical aspects of environmental engineering along with the design and management applications

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – VI

Branch	Subject Title	Subject Code
CE	Design of RCC Structure	DCEP601

Course Objective: To impart understanding of various aspects of design of Reinforced Concrete.

Unit I

Working Stress Method & Prestressed Concrete

Introduction to reinforced concrete, R.C. Sections their behavior, grades of concrete steel. Permissible stresses, Assumptions in W.S.M.

Equivalent bending stress distribution diagram for singly reinforced section,

Concept of prestressed concrete, externally and internally prestressed member.

Advantages and disadvantages of prestressed concrete.

Methods of prestressing, pretensioning and post tensioning. Losses in prestressing. (No numerical problems shall be asked in written examination on pre-stressed concrete.)

Unit II

Limit State Method

Definition, types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load. Loading on structure as per I.S 875.

I.S. Specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam column & footing, minimum reinforcement in slab, beam & column, lapping, anchoring effective span for beam, & slab

Unit III

Analysis and Design of Singly Reinforced Sections (LSM)

Limit State of collapse (Flexure), Assumptions, stress, Strain relationship for concrete and steel, neutral axis, Stress block diagram and Strain diagram for singly reinforced section.

Concept of under- reinforced, over-reinforced and balanced section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for balanced

singly R.C. Section. Simple numerical problems on determining design constants, moment of resistance and area of steel.

Unit IV

Analysis and Design of Doubly Reinforced Sections (LSM)

General features, necessity of providing doubly reinforced section reinforcement limitations.

Analysis of doubly reinforced section, strain diagram, stress diagram, depth of neutral axis, moment of resistance of the section.

Simple numerical problems on finding moment of resistance and design of beam sections.

Unit V

Shear, Bond and Development Length (LSM)

Nominal Shear stress in R.C. Section, design shear strength of concrete, maximum shear stress, Design of shear reinforcement, Minimum shear reinforcement, forms of shear reinforcement.

Bond and types of bond, Bond Stress, check for bond stress, Development length in tension and compression, anchorage value for hooks 90° bend and 45° bend Standard Lapping of bars, check for development length.

Simple numerical problems on deciding whether shear reinforcement are required or not, check for adequacy of the section in shear. Design of shear reinforcement; Minimum shear reinforcement in beams; Determination of Development length required for tension reinforcement of cantilevers beam and slab, check for development length

Unit VI

Analysis and Design of T-Beam (LSM)

General features, advantages, effective width of flange as per IS : 456-2000 code provisions.

Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam Section with neutral axis lying within the flange Design of T-beam for moment and shear for Neutral axis within or up to flange bottom. Simple numerical problems on deciding effective flange width. (Problems only on finding moment of resistance of T-beam section with N. A. lies within or upto the bottom of flange shall be asked in written examination.)

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Unit VII

Design of Slab (LSM)

Design of simply supported one-way slabs for flexure check for deflection control, and shear

Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.

Design of two-way simply supported slabs for flexure with corner free to lift.

Design of dog-legged staircase.

Simple numerical problems on design of one-way simply supported slabs cantilever slab & two-way simply supported slab. (No problem on design of dog-legged staircase shall be asked in written examination.)

Unit VIII

Design of Axially Loaded Column and Footing (LSM)

Assumptions in limit state of collapse – compression

Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.

Analysis and design of axially loaded short, square, rectangular and circular columns with lateral ties only; check for short column and check for minimum eccentricity may be applied.

Types of footing, Design of isolated square footing for flexure and shear.

Simple numerical problems on the design of axially loaded short columns and isolated square footing. (Problems on design of footing shall be asked in written examination for moment and two way shear only.)

Books/ Reference:- 1. Limit State Theory & Design of Reinforced Concrete by Dr. V.L. Shah & Late Dr. S.R. Karve. Structure Publications 2. Fundamentals of Reinforced concrete by N.C. Sihna & S.K. Roy S.Chand& Company 3. Reinforced concrete Design (IS 456-2000) Principles & Practice by N.Krishna Raju R.N. Pranesh New Age International 4. Prestressed Concrete by N. Krishna Raju 5. Reinforced concrete Design by S.U. Pillai & Devdas Menon Tata Mcgraw Hill. 6. Limit State Design of Reinforced Concrete by P.C. Varghase Prentice Hall of India. 7. R.C.C. Design by Shah & Kale

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Course Outcomes:-

1. To develop basic understanding of reinforced concrete as a construction material.

2. To develop understanding of various design philosophies and their differences.

3. To understand behavior of RCC beams.

4. To understand behavior of RCC members under flexural shear.

5. To understand behavior of compression members.

6. To understand behavior of two-way slabs using moment coefficient

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

New Scheme Based on AICTE Flexible Curricula

Semester – VI

Branch	Subject Title	Subject Code
CE	: Geo-informatics	DCEOE605

Course Objective:- The objective of the course is to provide theory as well as hand-on skill to students for various applications in Remote-Sensing (RS), GIS, and skills towards professional digital analysis of geo-spatial data.

Unit I

Aerial Photographs- Basic terms & Definitions, scales, relief displacements, Flight Planning, Stereoscopy, Characteristics of photographic images, Fundamentals of aerial photo-interpretation

Unit II

Physics of remote sensing, Ideal remote sensing system, Remote sensing satellites and their data products, Sensors and orbital characteristics, Spectral reflectance curves, resolution and multi-concept, FCC.

Unit III

Satellite Image - Characteristics and formats, Image histogram, Introduction to Image rectification, Image Enhancement, Land use and land cover classification system, Supervised Classification, Applications of remote sensing

Unit IV

Basic concepts of geographic data, GIS and its components, Data acquisition, Raster and Vector formats, topology and Data models, Spatial modeling, Data output, GIS Applications Introduction Satellite navigation System, GPS- Space segment, Control segment, User segment, GPS satellite signals, Receivers, Static, Kinematic and Differential GPS.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

BOOKS/REFERENCES

1. Leicka. A.: GPS Satellite Surveying, John Wiley & Sons, use. New York

2. Terry-Karen Steede, 2002, Integrating GIS and the Global Positioning System, ESRI Press

3. N. K. Agrawal Essentials of GPS, Spatial Network Pvt. Ltd 2004

4. Sathish Gopi, GPS and Surveying using GPS

Course Outcomes:-

1. An ability to independently carry out investigation and development work to solve real life geospatial problems.

2. An ability to write and present a substantial technical report/document/international level research articles.

3. Students should be able to demonstrate a degree of mastery over the areas of Geoinformatics.

4. An ability to share theoretical and practical knowledge in both teaching and research as well as in industries.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – VI

Branch	Subject Title	Subject Code
CE	Disaster Management	**DCEOE04**

Course Objectives: - Following are the objectives of this course:

1. To learn about various types of natural and man-made disasters.

2. To know pre and post disaster management for some of the disasters.

3. To know about various information and organizations in disaster management in India.

4. To get exposed to technological tools and their role in disaster management.

Unit-I

Understanding Disaster:

Understanding the Concepts and definitions of Disaster, Hazards Vulnerability, Risk, Capacity– Disaster and Development, and disaster management.

Unit-II

Types, Trends, Causes, Consequences and Control of Disasters:

Geological Disasters (earthquakes, landslides, tsunami); Hydro- Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves) Biological Disasters (epidemics, pest attacks, forest fire); Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters) Global Disaster Trends – Emerging Risks of Disasters– Climate Change and Urban Disasters. 10

Unit-III

Disaster Management Cycle and Framework:

1. Disaster Management Cycle – Paradigm Shift in Disaster Management. Pre Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and awareness.

2. During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation

3. Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure– Early Recovery – Reconstruction and Redevelopment.

Unit-IV

Disaster Management in India:

1. Disaster Profile of India – Mega Disasters of India and Lessons Learnt. Disaster Management Act 2005.

2. National Policy on Disaster Management, National Guidelines and Plans on Disaster Management.

3. Role of Government (local, state and national), Non-Government and Inter Governmental Agencies

Unit-V

Applications of Science and Technology for Disaster Management:

1. Geo-informatics in Disaster Management (GIS, GPS and RS). Disaster Communication System (Early Warning and Its Dissemination).

2. S&T Institutions for Disaster Management in India.

BOOKS/ References:-

1. Publications of National Disaster Management Authority (NDMA) on Various Templates and Guidelines for Disaster Management.

2. Bhandani, R.K., An overview on natural & manmade disasters and their reduction, CSIR, New Delhi

3. Srivastava, H.N., and Gupta G.D., Management of Natural Disasters in developing countries, Daya Publishers, Delhi

4. Alexander ,David ,Natural Disasters ,Kluwer Academic London

5. Ghosh ,G.K., Disaster Management ,APH Publishing Corporation

6. Murthy, D.B.N., Disaster Management :Text & Case Studies , Deep & Deep Pvt. Ltd

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Course Outcomes:-

1. Understand the need and significance of studying disaster management

2. Understand the different types of disasters and causes for disasters.

3. Gain knowledge on the impacts Disasters on environment and society

4. Study and assess vulnerability of a geographical area.

5. Students will be equipped with various methods of risk reduction measures and risk mitigation.

6. Understand the role of Information Technology in Disaster Management

7. Understand Geographical Information System applications in Disaster Management

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – VI

Branch	Subject Title	Subject Code
CE	Introduction To Artificial Intelligence	**DCEOE609**

Course Objectives: - To design a system capable of thinking for itself just like humans do. Currently, general AI is still under research, and efforts are being made to develop machines that have enhanced cognitive capabilities.

Unit-I

Introduction: Overview of Artificial intelligence- Problems of AI, AI technique, Tic - Tac - Toe problem. Intelligent Agents: Agents & environment, nature of environment, structure of agents, goal based agents.

Unit-II

Search techniques: Computer Science & Engineering Syllabus Solving problems by searching: problem solving agents, searching for solutions; uniform search strategies: breadth first search, depth first search, depth limited search, bidirectional search, comparing uniform search strategies. Heuristic search strategies: Greedy best-first search, A* search, memory bounded heuristic search

Unit-III

Knowledge & reasoning: Knowledge representation issues, representation & mapping, approaches to knowledge representation, issues in knowledge representation. Using predicate logic

Unit-IV

Planning: Overview, components of a planning system, Goal stack planning, Hierarchical planning, other planning techniques. Natural Language processing : Introduction, Syntactic processing, semantic analysis, discourse & pragmatic processing.

Unit-V

Learning: Forms of learning, inductive learning, learning decision trees, explanation based

learning.

Course Outcomes:-Identify problems where artificial intelligence techniques are applicable.

Apply selected basic AI techniques; judge applicability of more advanced techniques.

Participate in the design of systems that act intelligently and learn from experience

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula
Semester – VI

Branch	Subject Title	Subject Code
CE	Auto CAD	**DCEP653**

Practical Competencies

- Practice on Drawing basics

- Geometrical Drawing Practice

- Making plan of Projection.

- Creation Multi-view Orthographic projection.

- Drafting views in First angle & Third angle Projection.

- Creating Auxiliary views & Sections. • Freehand Sketching.

- Representing Standard base 2D drafting.

- Drawing Elementary CADD command – Line, Polyline, Polygon, Circle, Polyline, arc, ellipse, Text Single Text, Multi text, D text.

- Modifying Elementary Commands – Erase, Move, Copy, Mirror, Offset, Scale, Stretch, Chamfer, fillet & explode. • Making layers, line type & Line weight.

- Different menus of Auto-Cad, Function keys, Shortcut keys, Paper size.

- Making Title Block, Writing it & inserting it in any drawing file with scale, angle & explode options.

- Creating a new template file (Dwt file) & applying it to every drawing file.

- Drafting of building plan, Elevation, Section Views.

Course Outcomes: At the end of the course, the student will be able to:

1. Use the AutoCAD commands for drawing 2D & 3D building drawings required for different civil Engg. Applications.

2. Plan and draw Civil Engineering Buildings as per aspect and orientation.

3. Presenting drawings as per user requirements and preparation of technical report

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Book/References:

1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.

2. Engineering Graphics by P. J. Sha – S. Chand & Co.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – VI

Branch	Subject Title	Subject Code
CE	PLC AND SCADA	DCEOE608

COURSE OBJECTIVES:

1. To get familiar with industrial automation with PLC
2. To get familiar with industrial automation with SCADA
3. Knowing the basics of HMI

UNIT 1

Programmable Logic Controllers: Introduction, Parts of a PLC, Principles of Operation, Modifying the Operation, PLCs versus Computers, PLC Size and Application. PLC Hardware Components: The I/O Section, Discrete I/O Modules, Analog I/O Modules, Special I/O Modules, I/O Specifications, The Central Processing Unit (CPU), Memory Design, Memory Types, Programming Terminal Devices, Recording and Retrieving Data, Human Machine Interfaces (HMIs). Basics of PLC Programming: Processor Memory Organization, Program Scan, PLC Programming Languages, Relay-Type Instructions, Instruction Addressing, Branch Instructions, Internal Relay Instructions, Programming Examine If Closed and Examine If Open Instructions, Entering the Ladder Diagram, Modes of operation

UNIT 2

Developing Fundamental PLC Wiring Diagrams and Ladder Logic Programs: Electromagnetic Control Relays, Contactors, Motor Starters, Manually Operated Switches, Mechanically Operated Switches, Sensors, Output Control Devices, Seal-in Circuits, Latching Relays, Converting Relay Schematics into PLC Ladder Programs, Writing a Ladder Logic Program Directly from a Narrative Description. Programming Timers: Mechanical Timing Relays, Timer Instructions, On-Delay Timer Instruction, Off-Delay Timer Instruction, Retentive Timer, Cascading Timers.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

UNIT 3

SCADA Fundamentals: Introduction, Open system: Need and advantages, Building blocks of SCADA systems, Remote terminal unit (RTU): Evolution of RTUs, Components of RTU, Communication subsystem, Logic subsystem, Termination subsystem

UNIT 4

Human-Machine Interface (HMI): HMI components, HMI software functionalities, Situational awareness, Intelligent alarm filtering: Need and technique, Alarm suppression techniques, Operator needs and requirements.

UNIT 5

SCADA Systems: Building the SCADA systems, legacy, hybrid, and new systems, Classification of SCADA systems, SCADA implementation: A laboratory model: The SCADA laboratory, System hardware, System software, SCADA lab field design.

Text Books:

Programmable Logic Controllers Frank D Petruzella McGraw Hill 4th Edition, 2011

Power System SCADA and Smart Grids Mini S. Thomas CRC Press 3rd Edition, 2015

Course Outcomes: students will be able to

1. Do the ladder logic program in PLC
2. Understand the working with PLC and SCADA
3. Analyze the working of HMI

Course Objectives:

- To introduce the basic concepts, parts of robots and types of robots.
- To make the student familiar with the various drive systems for robot, sensors and their applications in robots and programming of robots.
- To select the robots according to its usage.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – VI

Branch	Subject Title	Subject Code
CE	Robotics	**DCEOE607**

Course Content:

UNIT-I: Fundamentals of Robotics: Introduction; Definition; Robot anatomy (parts) and its working; Robot Components: Manipulator, End effectors; Construction of links, Types of joints; Classification of robots; Cartesian, Cylindrical, Spherical, Scara, Vertical articulated; Structural Characteristics of robots; Mechanical rigidity; Effects of structure on control work envelope and work Volume; Robotwork Volumes, comparison; Advantages and disadvantages of robots.

Unit-II: Robotic Drive System and Controller: Actuators; Hydraulic, Pneumatic and Electrical drives; Linear actuator; Rotary drives; AC servo motor; DC servo motors and Stepper motors; Con- version between linear and rotary motion; Feedback devices; Potentiometers; Optical encoders; DC tachometers; Robot controller; Level of Controller; Open loop and Closed loop controller; Microprocessor based control system; Robot path control: Point to point, Continuous path control and Sensor based path control; Controller programming.

Unit-III: Sensors: Requirements of a sensor; Principles and Applications of the following types of sensors: Position sensors (Encoders, Resolvers, Piezo Electric); Range sensors (Triangulation Principle, Structured lighting approach); Proximity sensing; Force and torque sensing.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Reference Books:

1. Introduction to Robotics: Analysis, Systems, Applications – Saeed B. Niku, Pearson Education Inc. New Delhi 2006.

2. Industrial Robotics: Technology, Programming and Applications – M.P. Groover, Tata McGraw Hill Co, 2001.

3. Robotics Control, Sensing, Vision and Intelligence – Fu.K.S. Gonzalz.R.C and Lee C.S.G, Mc-Graw Hill Book Co, 1987.

4. Robotics for Engineers – Yoram Koren, McGraw Hill Book Co, 1992.

5. A Text book on Industrial Robotics – Ganesh S. Hedge, Laxmi Publications Pvt. Ltd., New Del-hi, 2008.

Course outcomes:

At the end of the course, the student will be able to:

1. Explain the robot anatomy, classification, characteristics of robot, advantages and disadvantages.

2. Explain the various robotic actuators on hydraulic, pneumatic and electrical drives.

3. Explain about various types of sensors and concepts on robot vision system.

4. Explain the various applications of robots.

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)
New Scheme Based on AICTE Flexible Curricula

Semester – VI

Branch	Subject Title	Subject Code
CE	Entrepreneurship	**DCEH603**

Course Objectives:-

1. Acquiring Entrepreneurial spirit and resourcefulness.

2. Familiarization with various uses of human resource for earning dignified means of living.

3. Understanding the concept and process of entrepreneurship - its contribution and role in the growth and development of individual and the nation.

4. Acquiring entrepreneurial quality, competency, and motivation.

5. Learning the process and skills of creation and management of entrepreneurial venture.

UNIT-I

Introduction to Entrepreneurship Meaning and concept of entrepreneurship, the history of entrepreneurship development, role of entrepreneurship in economic development, Myths about entrepreneurs, agencies in entrepreneurship management and future of entrepreneurship types of entrepreneurs.

UNIT-II

The Entrepreneur Why to become entrepreneur, the skills/ traits required to be an entrepreneur, Creative and Design Thinking, the entrepreneurial decision process, skill gap analysis, and role models, mentors and support system, entrepreneurial success stories.

UNIT-III

E-Cell Meaning and concept of E-cells, advantages to join E-cell, significance of E-cell, various activities conducted by E-cell

UNIT-IV

Communication Importance of communication, barriers and gateways to communication, listening to people, the power of talk, personal selling, risk taking & resilience, negotiation.

UNIT-V

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

Introduction to various form of business organization (sole proprietorship, partnership, corporations, Limited Liability company), mission, vision and strategy formulation

Reference Books:

1. Udyamita by Dr. MMP. Akhouri and S.P Mishra, pub. By National Institute for Entrepreneurship and Small Business Development (NIESBUD), NSIC-PATC Campus, Okhla

2. Everyday Entrepreneurs- The harbingers of Prosperity and creators of Jobs-Dr. Aruna Bhargava.

Learning Outcome:

Upon completion of the course, the student will be able to demonstrate knowledge of the following topics:

1. Understanding the dynamic role of entrepreneurship and small businesses

2. Organizing and Managing a Small Business

3. Financial Planning and Control

4. Forms of Ownership for Small Business

5. Strategic Marketing Planning

6. New Product or Service Development

7. Business Plan Creation

RKDF UNIVERSITY RANCHI

DIPLOMA IN CIVIL ENGINEERING (DIPLOMA CE)

SUGGESTED LEARNING RESOURCES:

S. No.	Title of Book	Author	Publication
1.	The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company	Steve Blank and Bob Dorf	K & S Ranch ISBN – 978-0984999392
2.	The Lean Startup: How Today's Entre- preneurs Use Continuous Innovation to Create Radically Successful Businesses	Eric Ries	Penguin UK ISBN – 978-0670921607
3.	Demand: Creating What People Love Before They Know They Want It	Adrian J. Slywotzky with Karl Weber	Headline Book Publishing ISBN – 978-0755388974
4.	The Innovator's Dilemma: The Revolu- tionary Book That Will Change the Way You Do Business	Clayton M. Chris-tensen	Harvard business ISBN: 978-142219602

SUGGESTED SOFTWARE/LEARNING WEBSITES:

1. https://www.fundable.com/learn/resources/guides/startup
2. https://corporatefinanceinstitute.com/resources/knowledge/finance/corporate-Structure/
3. https://www.finder.com/small-business-finance-tips

   https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/