DIPLOMA WING

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA , BHOPAL

SCHEME OF STUDIES & EXAMINATIONS (IMPLEMENTED FROM SESSION : JULY 2023)

SCHEME	NAME OF BRANCH	BRANCH CODE	SEMESTER
OCBC JULY2022/2023	CIVIL ENGINEERING	C03	FOURTH (IV)

S.N.	PAPER CODE	SUBJECT CODE	SUBJECT NAME	THEORY COMPONENT								PRACTICAL COMPONENT					TOTAL CREDITS	TOTAL MARKS
				HRS PER WEEK	CREDITS	TERM WORK				THEORY PAPER		HRS PER WEEK	CREDITS	LAB WORK	PRACTICAL EXAM/VIVA			
						QUIZ/ASSIGNMENT	MID TERM TEST*		TOTAL	MARKS	DURATION				MARKS	DURATION		
							I	II										
1	7372	401	HYDRAULICS	3	3	10	10	10	30	70	03 Hrs.	2	1	20	30	03 Hrs.	4	150
2	7373	402	ADVANCED SURVEYING	3	3	10	10	10	30	70	03 Hrs.	2	1	20	30	03 Hrs.	4	150
3	7374	403	THEORY OF STRUCTURES	3	3	10	10	10	30	70	03 Hrs.	0	0	0	0	0	3	100
4	7375	404	BUILDING PLANNING AND DRAWING	1	1	10	10	10	30	70	03 Hrs.	4	2	20	30	03 Hrs.	3	150
5	7376	405	WATER RESOURCES ENGINEERING	2	2	10	10	10	30	70	03 Hrs.	2	1	20	30	03 Hrs.	3	150
6	7377	406	TRANSPORTATION ENGINEERING	2	2	10	10	10	30	70	03 Hrs.	2	1	20	30	03 Hrs.	3	150
7	7378	411	PRECAST AND PRESTRESSED CONCRETE OR	3	3	10	10	10	30	70	03 Hrs.	0	0	0	0	0	3	100
	7379	412	CONSTRUCTION MANAGEMENT															
8			MINOR PROJECT	0	0	0	0	0	0	0	0	4	2	20	30	03 Hrs.	2	50
9			ESSENCE OF INDIAN KNOWLEDGE AND TRADITION	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10			LIBERARY /SEMINAR/VISITS etc.	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
TOTAL				19	17				210	490		17	8	120	180		25	1000

NOTE - (1)* Two Best,out of Three Mid Term Tests (Progressive Tests) Marks should be entered here.

GRAND TOTAL OF CREDITS	GRAND TOTAL OF MARKS
25	1000

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN CIVIL ENGINEERING (C03)

SEMESTER IV

COURSE TITLE	:	HYDRAULICS
PAPER CODE	:	7372
SUBJECT CODE	:	401
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	01

Course Objectives:

Following are the objectives of this course:

- To understand parameters associated with fluid flow and hydrostatic pressure.
- To know head loss and water hammer in fluid flowing through pipes.
- To learn different types of pumps and their uses.

Course Content

Unit – I 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, 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, 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

Unit– II 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.

Unit– III Flow through pipes

- Major head loss in pipe: Frictional loss and its computation by Darcy's Weisbach equation, Use of Moody's Diagram and Nomograms.
- 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: Venturi meter - construction and working.
- Discharge measurement using Orifice, Hydraulic Coefficients of Orifice.

Unit– IV Flow through Open Channel

- Geometrical properties of channel section: Wetted area, wetted perimeter, hydraulic radius for rectangular and trapezoidal channel section.
- Determination of discharge by Chezy's equation and Manning's equation.
- Conditions for most economical rectangular and trapezoidal channel section.
- Discharge measuring devices: Triangular and rectangular Notches.
- Velocity measurement devices: current meter, floats and Pitot's tube.
- Specific energy diagram, Froudes' Number

Unit– V Hydraulic Pumps

- Concept of pump, Types of pump - centrifugal, reciprocating, submersible.
- Centrifugal pump: components and working
- Reciprocating pump: single acting and double acting, components and working.
- Suction head, delivery head, static head, Manometric head
- Power of centrifugal pump.
- Selection and choice of pump.

Suggested learning resources:

1. Modi, P. N.and Seth, S.M., Hydraulics and Fluid Mechanics, Standard book house, Delhi.
2. S.S. Rattan, Fluid Mechanics & Hydraulic Machines, Khanna Book Publishing Co., New Delhi
3. Ramamrutham, and Narayan, R., Hydraulics, Fluid Mechanics and Fluid Machines, Dhanpat Rai Publishing Company, New Delhi.
4. Khurmi R S, Hydraulics, Fluid Mechanics, Hydraulic machines, S. Chand Publishers
5. Rajput, R K, Fluid Mechanics, S Chand, New Delhi.
6. Ojha, C S P, Berndtsson, R, and Chandramoulli P. N., Fluid Mechanics and Machinery, Oxford University Press, New Delhi.

Course outcomes:

After competing this course, student will be able to:

- Measure pressure and determine total hydrostatic pressure for different conditions.
- Understand various parameters associated with fluid flow
- Determine head loss of fluid flow through pipes.
- Find the fluid flow parameters in open channels.
- Select relevant hydraulic pumps for different applications.

HYDRAULICS LAB

Course Objectives:

Following are the objectives of this course:

- To understand parameters associated with fluid flow and hydrostatic pressure.
- To know head loss and water hammer in fluid flowing through pipes.
- To learn different types of pumps and their uses.

List of Practicals to be performed:

1	Use piezometer to measure pressure at a given point.
2	Use Bourdon's Gauge to measure pressure at a given point.
3	Use U tube differential manometer to measure pressure difference between two given points.
4	Find the resultant pressure and its position for given situation of liquid in a tank.
5	Use Reynold's apparatus to determine type of flow.
6	Use Bernoulli's apparatus to apply Bernoulli's theorem to get total energy line for a flow in a closed conduit of varying cross sections.
7	Use Friction factor Apparatus to determine friction factor for a given pipe.
8	Determine minor losses in pipe fittings due to sudden contraction and sudden enlargement.
9	Determine minor losses in pipe fitting due to Bend and Elbow.
10	Calibrate Venturi meter to find out the discharge in a pipe.
11	Calibrate the Orifice to find out the discharge through a tank
12	Use Current meter to measure the velocity of flow of water in open channel.
13	Use Pitot tube to measure the velocity of flow of water in open channel.
14	Use triangular notch to measure the discharge through open channel.
15	Use Rectangular notch to measure the discharge through open channel.
16	Determine the efficiency of centrifugal pump.

Suggested learning resources:

1. Modi,P. N.and Seth, S.M., Hydraulics and Fluid Mechanics, Standard book house, Delhi.
2. S.S. Rattan, Fluid Mechanics and Hydraulic Machines, Khanna Publishing House, Delhi
3. Ramamrutham, and Narayan, R., Hydraulics, Fluid Mechanics and Fluid Machines, Dhanpat Rai Publishing Company, New Delhi.
4. Khurmi,R S, Hydraulics, Fluid Mechanics, Hydraulic machines, S Chand Publishers, New Delhi.
5. Rajput, R K, Fluid Mechanics, S Chand, New Delhi.
6. Ojha, C S P, Berndtsson, R, and Chandramoulli P. N., Fluid Mechanics and Machinery, Oxford University Press, New Delhi.

Course outcomes:

After competing this course, student will be able to:

- Measure pressure and determine total hydrostatic pressure for different conditions.
- Understand various parameters associated with fluid flow.
- Determine head loss of fluid flow through pipes.
- Find the fluid flow parameters in open channels.
- Select relevant hydraulic pumps for different applications.

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DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN CIVIL ENGINEERING (C03)

SEMESTER IV

COURSE TITLE	:	ADVANCED SURVEYING
PAPER CODE	:	7373
SUBJECT CODE	:	402
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	01

Course Objectives:

Following are the objectives of this course:

- To know methods of plane surveying and Theodolite surveying and their uses
- To learn tacheometric surveying and curve setting
- To understand the principles of Electronic Distance Measurement equipment and Total station and their use.
- To know the concept of remote sensing, GPS and GIS

Course Content

Unit – I Plane Table Surveying

- Principles of plane table survey.
- Accessories of plane table and their use, Telescopic alidade.
- Setting of plane table; Orientation of plane table - Back sighting and Magnetic meridian method, True Meridian Method.
- Methods of plane table surveys- Radiation, Intersection and Traversing.
- Merits and demerits of plane table survey.

Unit– II Theodolite Surveying

- Types and uses of Theodolite, Components of transit Theodolite and their functions, Reading the Vernier of transit Theodolite.
- Technical terms- Swinging, Transiting, Face left, Face right.
- Fundamental axes of transit Theodolite and their relationship
- Temporary adjustment of transit Theodolite.
- Measurement of horizontal angle- Direct and Repetition method, Errors eliminated by method of repetition.
- Measurement of magnetic bearing of a line, Prolonging and ranging a line, deflection angle.
- Measurement of vertical Angle.
- Theodolite traversing by Included angle method and Deflection angle method.
- Checks for open and closed traverse, Calculations of bearing from angles.
- Traverse computation-Latitude, Departure, Consecutive coordinates, Independent coordinates, balancing the traverse by Bowditch's rule and Transit rule, Gale's Traverse table computation.

Unit– III Tacheometric surveying and Curve setting

- Principles of Tacheometry, Tacheometer and its component parts, Anallatic lens.
- Tacheometric formula for horizontal distance with telescope horizontal and staff vertical.
- Field method for determining constants of tacheometer, Determining horizontal and vertical distances with tacheometer by fixed hair method and staff held vertical, Limitations of tacheometry.

- Types of curves used in roads and railway alignments. Designation of curves.
- Setting simple circular curve by offsets from long chord and Rankine's method of deflection angles.

Unit– IV Advanced surveying equipments

- Principle of Electronic Distance Meter (EDM), its component parts and their Functions, use of EDM.
- Use of micro optic Theodolite and Electronic Digital Theodolite.
- Use of Total Station, Use of function keys.
- Measurements of Horizontal angles, vertical angles, distances and coordinates using Total Station, Traversing, Profile Survey and Contouring with Total Station.

Unit– V Remote sensing, GPS and GIS

- Remote Sensing – Overview, Remote sensing system, Applications of remote sensing in Civil engineering, land use / Land cover, mapping, disaster management.
- Use of Global Positioning System (G.P.S.) instruments.
- Geographic Information System (GIS): Over view, Components, Applications, Software for GIS.
- Introduction to Drone Surveying.

Suggested learning resources:

1. Kanetkar, T. P.; Kulkarni, S. V., Surveying and Levelling Part I and II, Pune Vidyarthi Gruh Prakashan, Pune.
2. Basak, N. N.,Surveying and Levelling, McGraw Hill Education (India) Pvt. Ltd.,Noida.
3. Duggal, S. K., Survey I and Survey II, Tata McGraw Hill Education Pvt. Ltd., Noida.
4. Saikia, M D.; Das. B.M.; Das. M.M., Surveying PHI Learning Pvt. Ltd., New Delhi.
5. Subramanian, R., Surveying and Levelling, Oxford University Press. New Delhi.
6. Punmia, B.C,; Jain, Ashok Kumar; Jain, Arun Kumar, Surveying Vol. I and Surveying Vol. II, Laxmi Publications Pvt. Ltd., New Delhi.
7. Rao, P. Venugopala Akella, Vijayalakshmi, Textbook of Surveying, PHI Learning Pvt. Ltd., New Delhi.
8. Venkatramaiah, C, Textbook of Surveying, Universities Press, Hyderabad.
9. Anderson, James M and Mikhail, Edward M, Surveying theory and practice, Mc Graw Hill Education, Noida.
10. De, Alak, Plane Surveying, S.Chand Publications, New Delhi.

Course outcomes:

After completing this course, student will be able to:

- Prepare plans using Plane Table Surveys.
- Prepare plans using Theodolite surveys.
- Find distances and elevations using Tachometer.
- Prepare plans using Total Station instrument.
- Locate coordinates of stations using GPS.

ADVANCED SURVEYING LAB

Course Objectives:

Following are the objectives of this course:

- To know methods of plane surveying, Theodolite surveying and their uses.
- To learn tacheometric surveying and curve setting.
- To understand the principles of Electronic Distance Measurement and Total station and their uses.
- To know the concept of Remote Sensing, GPS and GIS.

List of Practicals to be performed

1	Use plane table survey to prepare plans of a plot of seven sided closed traverse by Radiation Method.
2	Use plane table survey to prepare plans, locate details by Intersection Method.
3	Use plane table survey to prepare plans, locate details by Traversing Method.
4	Use plane table survey to carry out Survey Project for closed traverse for minimum five sides around a building.
5	Use transit theodolite to measure Horizontal and Vertical angle by Direct Method.
6	Plot the traverse on A1 size imperial drawing sheet for the collected data from preceding Theodolite Survey Project.
7	Use Thedolite as a Tacheometer to compute reduced levels and horizontal distances.
8	Set out a circular curve by Rankine's Method of Deflection Angles.
9	Use micro optic Theodolite to Measure Horizontal angle by Direct Method.
10	Use EDM to measure horizontal distance.
11	Use Total station instrument to measure horizontal distances.
12	Use Total station instrument to measure vertical angle.
13	Use Total station instrument to carry out Survey Project for closed traverse for minimum five sides.
14	Plot the traverse on A1 size imperial drawing sheet for the collected data from preceding Total Station Survey Project.
15	Use GPS to locate the coordinates of a station.

Suggested learning resources

1. Kanetkar, T. P.; Kulkarni, S. V., Surveying and Levelling Part I and II, Pune Vidyarthi Gruh Prakashan, Pune.
2. Basak, N. N.,Surveying and Levelling, McGraw Hill Education (India) Pvt. Ltd.,Noida.
3. Duggal, S. K., Survey I and Survey II, Tata McGraw Hill Education Pvt. Ltd., Noida.
4. Saikia, M D.; Das. B.M.; Das. M.M., Surveying PHI Learning Pvt. Ltd., New Delhi.
5. Subramanian, R., Surveying and Levelling, Oxford University Press. New Delhi.
6. Punmia, B.C,; Jain, Ashok Kumar; Jain, Arun Kumar, Surveying Vol. I and Surveying Vol. II, Laxmi Publications Pvt. Ltd., New Delhi.
7. Rao, P. Venugopala Akella, Vijayalakshmi, Textbook of Surveying, PHI Learning Pvt. Ltd., New Delhi.
8. Venkatramaiah, C, Textbook of Surveying, Universities Press, Hyderabad.
9. Anderson, James M and Mikhail, Edward M, Surveying theory and practice, Mc Graw Hill Education, Noida.
10. De, Alak, Plane Surveying, S.Chand Publications, New Delhi.

Course outcomes:

After completing this course, student will be able to:

- Prepare plans using Plane Table Surveys.
- Prepare plans using Theodolite surveys.
- Find distances and elevations using Tachometer.
- Make measurements using Total Station.
- Locate coordinates of survey stations using GPS

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DIPLOMA WING
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DIPLOMA IN CIVIL ENGINEERING (C03)

SEMESTER IV

COURSE TITLE	:	THEORY OF STRUCTURES
PAPER CODE	:	7374
SUBJECT CODE	:	403
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	00

Course Objectives:

Following are the objectives of this course:

- 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.

Course Content

Unit – I Direct and Bending Stresses in vertical members

- Introduction to axial and eccentric loads, eccentricity about one principal axis only, nature of stresses, Maximum and minimum stresses, resultant stresses and distribution diagram.
- 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.
- Chimneys of circular cross section subjected to wind pressure, Maximum and minimum stresses, resultant stresses and distribution diagram at base.
- Analysis of dams subjected to horizontal water pressure, conditions of stability, Maximum and minimum stresses, resultant stresses and distribution diagram at base.

Unit – II Slope and Deflection

- Concept of slope and deflection, stiffness of beams, Relation among bending moment, slope, deflection and radius of curvature, (no derivation).
- Double integration method to find slope and deflection of cantilever and simply supported beams subjected to concentrated load and uniformly distributed load on entire span.
- Macaulay's method for slope and deflection, application to cantilever and simply supported beam subjected to concentrated and uniformly distributed load on entire span.

Unit- III Fixed and Continuous Beam

- 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.
- Definition, effect of continuity, nature of moments induced due to continuity, concept of deflected shape, practical examples.

- Clapeyron's theorem of three moment (no derivation), Application of Clapeyron's theorem maximum up to three spans and two unknown support moment only, Support at same level spans having same and uniform moment of inertia subjected to concentrated loads and uniformly distributed loads over entire span.
- Drawing SF diagrams showing point of contraflexure, shear and BM diagrams showing net BM and point of contraflexure for continuous beams.

Unit– IV Moment distribution method

- Introduction to moment distribution method, sign convention, Carry over factor, stiffness factor, distribution factor.
- Application of moment distribution method to various types of continuous beams subjected to concentrated loads and uniformly distributed load over entire span having same or different moment of inertia, supports at same level, up to three spans and two unknown support moments only.
- Introduction to portal frames – Symmetrical and unsymmetrical portal frames with the concept of Bays and stories.

Unit– V Simple trusses

- Types of trusses (Simple, Fink, compound fink, French truss, pratt truss, Howe truss, North light 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.

Suggested learning resources:

1. Ramamrutham.S, Theory of structures, Dhanpatrai & Sons.
2. Khurmi, R. S. , Theory of Structures S. Chand and Co., New Delhi.
3. Bhavikatti, S S , Structural Analysis Vol-1, ,Vikas Publishing House Pvt Ltd.New Delhi.
4. Junnarkar, S. B. , Mechanics of structures, Volume-I and II Charotar Publishing House, Anand.
5. Pandit, G.S. and Gupta, S.P., Theory of Structures, Tata McGraw Hill, New Delhi.
6. Agor R, Structural Analysis, Khanna Publishing House, Delhi.

Course outcomes:

After competing this course, student will be able to:

- Analyze stresses induced in vertical member subjected to direct and bending loads.
- Analyze slope and Deflection in fixed and continuous beams.
- Analyze continuous beam under different loading conditions using the principles of Three Moments.
- Analyze continuous beam using Moment Distribution Method under different loading conditions.
- Evaluate axial forces in the members of simple truss.

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN CIVIL ENGINEERING (C03)

SEMESTER IV

COURSE TITLE	:	BUILDING PLANNING AND DRAWING
PAPER CODE	:	7375
SUBJECT CODE	:	404
TREORY CREDITS	:	01
PRACTICAL CREDITS	:	02

Course Objectives:

Following are the objectives of this course:

- To learn basic principles of building planning and drawing.To know graphical representation of various components of buildings.
- To draw complete plan and elevation of a building.
- To learn basics of perspective drawings and Computer Aided Drawings.

Course Content:

Unit – I Conventions and Symbols

- Conventions as per IS 962, symbols for different materials such as earthwork, brickwork, stonework, concrete ,woodwork 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- Monumental, Intimate, criteria for Proper Selection of scale for various types of drawing.
- Sizes of various standard papers/sheets.
- Reading and interpreting readymade Architectural building drawing (To be procured from Architect, Planning Consultants, Planning Engineer).

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.
- 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 staircase as per principles of planning.
- Line plans for public building-school building, primary health centre, restaurant, bank, post office, hostel, Function Hall and Library.

Unit– III Drawing of Load Bearing Structure

- Drawing of Single storey Load Bearing residential building (2 BHK) with staircase.
- Data drawing –plan, elevation, section, site plan, schedule of openings, construction notes with specifications, area statement, Planning and design of staircase- Rise and Tread for residential and public building.
- Working drawing – developed plan, elevation, section passing through staircase or WC and bath.
- Foundation plan of Load bearing structure.

Unit– IV Drawing of Framed Structure

- Drawing of Two storeyed Framed Structure (G+1), residential building (2 BHK) with staircase.
- Data drawing – developed plan, elevation, section, site plan, schedule of openings, construction notes with specifications, area statement. Planning and design of staircase- Rise and Tread for residential and public building.
- Working drawing of Framed Structure – developed plan, elevation, section passing through staircase or WC and bath.
- Foundation plan of Framed Structure.
- Details of RCC footing, Column, Beam, Chajjas, Lintel, Staircase and slab.
- Drawing with CAD- Draw commands, modify commands, layer commands.

Unit– V Perspective Drawing

- Definition, 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.

Suggested learning resources:

1. Shah. M.G. Kale, CM, Patki, S.Y., Building Drawing, Mcgraw Hill Publishing company Ltd. New Delhi.
2. Malik and Mayo, Civil Engineering Drawing, Computech Publication Ltd New Asian Publishers, New Delhi.
3. M. G. Shah and C. M. Kale, Principles of Perspective Drawing, Mcgraw Hill Publishing company Ltd. New Delhi.
4. Swamy, Kumara; Rao, N, Kameshwara, A ., Building Planning and Drawing, Charotar Publication, Anand.
5. Bhavikatti, S. S., Building Construction, Vikas Publication House Pvt. Ltd., New Delhi.
6. Mantri, Sandip, A to Z Building Construction, Satya Prakashan, New Delhi.
7. Singh, Ajit, Working with Auto CAD 2000, Mcgraw Hill Publishing company Ltd. New Delhi.
8. Sane, Y.S., Planning and design of Building, Allied Publishers, New Delhi.

Course outcomes:

After completing this course, student will be able to:

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 Framed Structure.
5. Draw two-point perspective drawing for given small objects.

BUILDING PLANNING AND DRAWING LAB

Course Objectives:

Following are the objectives of this course:

- To learn the basic principles of building planning and drawing.
- To make graphical representation of various components of buildings.
- To draw complete plan and elevation of a building.
- To learn basics of perspective drawings and Computer Aided Drawings.

List of Practicals/Drawings to be completed:

A. Sketch Book	
1	Draw various types of lines, graphical symbols for materials, doors and windows, symbols for sanitary, water supply and electrical installations and write abbreviations as per IS 962.
2	Write summary of observations of all technical details from the given drawing (One/Two BHK) obtained from the professional architect or civil engineer (Group activity in four students)

3	a) Measure the units of existing building (Load Bearing / Frame structure).
	b) Draw line plan of measured existing building at **serial no 3a** to the suitable scale.
4	Draw line plan to suitable scale (Minimum 1BHK, staircase, WC and Bathroom)
	a) Residential Bunglows (Minimum three plans)
	b) Apartment (Minimum two plans)
5	Draw line plans to suitable scale for any **Five** Public Buildings from the following (School Building, Primary Health Centre, Bank, Post Office, Hostel, Restaurant, Community Hall and Library).
6	Draw the following plans for a Framed Structure (One/Two BHK) from given line plan.
	a. Developed plan, Elevation
	b. Section for above developed plan.
	c. Site plan for above drawings including area statement, schedule of opening and construction notes.
B. Full Imperial Size Sheet (A1)	
1	Draw submission drawing to the scale 1:100 of a single storey load bearing residential building (2BHK) with flat Roof and staircase showing a)Developed plan and elevation
	b) Section passing through Stair **or** W.C. and Bath
	c) Foundation plan and schedule of openings.
	d) Site plan (1:200), area statement, construction notes.
2	Draw submission drawing, to the scale of 1:100, of (G+1) Framed Structure Residential Building (2BHK) with Flat Roof and staircase showing: a) Developed plan .
	b) Elevation.
	c) Section passing through Staircase,WC and Bath
	d) Site plan (1:200) and area statement
	e) Schedule of openings and Construction Notes.
3	Draw the above mentioned drawing at serial number (B-2) using CAD software and enclose the print out. a) Developed plan

	b) Elevation.
	c) Section passing through Staircase, W.C. and Bath
	d) Foundation plan .
	e) Site plan (1:200), area statement, Schedule of openings and construction notes.
4	Draw working drawing for above mentioned drawing at serial number (B-2) showing: a)Foundation plan to the scale 1:50
	b) Detailed enlarged section of RCC column and footing with plinth filling.
	c) Detailed enlarged section of RCC Beam, Lintel and Chajjas.
	d) Detailed enlarged section of RCC staircase and slab.
5	Draw two point perspective drawing of small objects - steps, monuments, pedestals (any one) scale 1:50
	a)Draw plan, elevation, eye level, picture plane and vanishing points
	b) Draw perspective view.

Suggested learning resources:

1. Shah. M.G. Kale, CM, Patki, S.Y., Building Drawing, Mcgraw Hill Publishing
2. Malik and Mayo, Civil Engineering Drawing, Computech Publication Ltd
3. M. G. Shah and C. M. Kale, Principles of Perspective Drawing, Mcgraw Hill
4. Swamy, Kumara; Rao, N, Kameshwara, A ., Building Planning and Drawing, Charotar Publication, Anand.
5. Bhavikatti, S. S., Building Construction, Vikas Publication House Pvt. Ltd., Delhi.
6. Mantri, Sandip, A to Z Building Construction, Satya Prakashan, New Delhi.
7. Singh, Ajit, Working with Auto CAD 2000, Mcgraw Hill Publishing company Ltd.
8. Sane, Y.S., Planning and design of Building, Allied Publishers, New Delhi.

Course outcomes:

After completing this course, student will be able to:

- Interpret the symbols, signs and conventions from the given drawing.
- Prepare line plans of residential and public buildings using principles of planning.
- Prepare working drawing for the given requirement of Load Bearing Structure.
- Prepare working drawing using CAD for the given requirement of Framed Structure.
- Draw two-point perspective drawing for given small objects.

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DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN CIVIL ENGINEERING (C03)

SEMESTER IV

COURSE TITLE	:	WATER RESOURCES ENGINEERING
PAPER CODE	:	7376
SUBJECT CODE	:	405
TREORY CREDITS	:	02
PRACTICAL CREDITS	:	01

Course Objectives:

Following are the objectives of this course:

- To learn estimation of hydrological parameters.
- To understand water demand of crops and provisions to meet the same.
- To know planning of reservoirs and dams.
- To design irrigation projects, canals and other diversion works.

Course Content:

Unit – I Introduction to Hydrology

- Hydrology: Definition and Hydrological cycle
- Rain Gauge: Symons 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.
- Yield and Dependable yield of a catchment, determination of dependable yield.

Unit– II Crop water requirement and Reservoir Planning

- 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.
- Surveys for irrigation project, data collection for irrigation project.
- Area capacity curve.
- Silting of reservoir, Rate of silting, factors affecting silting and control measures.
- Control levels in reservoir, Simple numerical problems on Fixing Control levels.

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.
- Well irrigation: types and yield of wells, advantages and disadvantages of well irrigation.

Unit– V Diversion Head Works & Canals

- Weirs – components, parts, types, K.T. weir – components and construction
- 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

Suggested learning resources:

1. Punmia, B.C., Pande, B, Lal, Irrigation and Water Power Engineering, Laxmi Publications
2. Subramanayan, Engineering Hydrology, McGraw Hill.
3. Mutreja K N, Applied Hydrology, McGraw Hill
4. Sharma, R.K. and Sharma, T.K., Irrigation Engineering, S.Chand
5. Basak, N.N., Irrigation Engineering, McGraw Hill Education
6. Asawa, G.L., Irrigation and water resource Engineering, New Age
7. Dahigaonkar, J.G., Irrigation Engineering, Asian Book Pvt. Ltd., New Delhi.
8. Garg, S K, Irrigation and Hydraulic Structures, Khanna Publishers, Delhi.
9. Priyani V.B., Irrigation Engineering, Charotar Book Stall, Anand.

Course outcomes:

After completing this course, student will be able to:

- Estimate hydrological parameters.
- Estimate crop water requirements of a command area and capacity of canals.
- Execute Minor and Micro Irrigation Schemes.
- Select the relevant Cross Drainage works for the specific site conditions.
- Design, construct and maintain simple irrigation regulatory structures.

WATER RESOURCES ENGINEERING LAB

Course Objectives:

Following are the objectives of this course:

- To learn estimation of hydrological parameters.
- To understand water demand of crops and provisions to meet the same.
- To know planning of reservoirs and dams.
- To design irrigation projects, canals and other diversion works.

List of Practicals to be performed

- Calculate average rainfall for the given area using arithmetic mean method.
- Calculate average rainfall for the given area using isohyetal, Theissen polygon method .
- Compute the yield of the Catchment area demarcated in **Sr.No.2**.
- Delineation of contributory area for the given outlet from the given topo-sheet.
- Estimate crop water requirement for the given data.
- Estimate capacity of the canal for the given data.
- Calculate reservoir capacity from the given data.
- Calculate control levels for the given data for a given reservoir.
- Draw a labeled sketch of the given masonry/earthen dam section.
- Draw the theoretical and practical profile of the given gravity dam section.
- Prepare a presentation on the technical details of any one micro or minor irrigation scheme.
- Prepare a model of any irrigation structure using suitable material.
- Prepare a maintenance report for any major/minor irrigation project site in the vicinity of your area, based on field visit.
- Prepare summary of the technical details of any existing water resource project in the vicinity of your area.
- Draw a labeled sketch of the given diversion head works and Cross Drainage works.
- Design a canal section for the given conditions with estimation of the quantity of material required for lining.

Suggested learning resources:

1. Punmia, B.C., Pande, B, Lal, Irrigation and water power engineering, Laxmi Publications
2. Subramanayan, Engineering Hydrology, McGraw Hill.
3. Mutreja K N, Applied Hydrology, McGraw Hill
4. Sharma, R.K. and Sharma, T.K., Irrigation Engineering, S.Chand and Company
5. Basak, N.N., Irrigation Engineering, McGraw Hill Education India Pvt. Ltd.
6. Asawa, G.L., Irrigation and water resource Engineering, New Age International(P)
7. Dahigaonkar, J.G., Irrigation Engineering, Asian Book Pvt. Ltd., New Delhi.
8. Garg, S K, Irrigation and Hydraulic structures, Khanna Publishers, Delhi.
9. Priyani V.B., Irrigation Engineering, Charotar Book Stall, Anand.

Course outcomes:

After completing this course, student will be able to:

- Estimate hydrological parameters.
- Estimate crop water requirements of a command area and capacity of canals.
- Execute Minor and Micro Irrigation Schemes.
- Select relevant Cross Drainage works for the specific site conditions.
- Design, construct and maintain simple irrigation regulatory structures.

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DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN CIVIL ENGINEERING (C03)

SEMESTER IV

COURSE TITLE	:	TRANSPORTATION ENGINEERING
PAPER CODE	:	7377
SUBJECT CODE	:	406
TREORY CREDITS	:	02
PRACTICAL CREDITS	:	01

Course Objectives::

Following are the objectives of this course:

- To identify the types of roads as per IRC recommendations.
- To understand the geometrical design features of different highways.
- To perform different tests on road materials.
- To identify the components of railway tracks.

Course Content:

Unit – I Overview of Highway Engineering

- Role of transportation in the development of nation, Scope and Importance of roads in India and its' Characteristics.
- Different modes of transportation – land way, waterway, airway. Merits and demerits of roadway and railway;
- General classification of roads.
- Selection and factors affecting road alignment.

Unit– II Geometric Design of Highway

- Camber: Definition, purpose, types as per IRC – recommendations.
- Kerbs: Road margin, road formation, right of way.
- Design speed and various factors affecting design speed as per IRC – recommendations.
- Gradient: Definition, types as per IRC – Recommendations.
- Sight distance (SSD): Definition, types IRC – recommendations, simple numerical.
- Curves: Necessity, types: Horizontal, vertical curves.
- Extra widening of roads: numerical examples.
- Super elevation: Definition, formula for calculating minimum and maximum Super elevation and method of providing super-elevation.
- Standards cross-sections of national highway in embankment and cutting.

Unit– III Construction of Road Pavements

- Types of road materials and their Tests – Test on aggregates-Flakiness and Elongation Index tests, Angularity Number test, test on Bitumen- penetration, Ductility, Flash and Fire point test and Softening point test.
- Pavement – Definition, Types, Structural Components of pavement and their functions

- Construction of WBM road. Merits and demerits of WBM & WMM road.
- Construction of Flexible pavement / Bituminous Road, Types of Bitumen and its properties, Emulsion, Cutback, Tar, Terms used in BR-prime coat, tack coat, seal coat, Merits and Demerits of BR.
- Cement concrete road -methods of construction, Alternate and Continuous Bay Method, Construction joints, filler and sealers, merits and demerits of concrete roads. Types of joints.

Unit– IV Basics of Railway Engineering

- Classification of Indian Railways, zones of Indian Railways
- Permanent way: Ideal requirement, Components; Rail Gauge, types, factors affecting selection of a gauge.
- Rail, Rail Joints - requirements, types.
- Creep of rail: causes and prevention.
- Sleepers - functions and Requirement, types - concrete sleepers and their density
- Ballast - function and types, suitability.
- Rail fixtures and fastenings – fish plate, spikes, bolts, keys, bearing plates, chairs-types of anchors and anti-creepers.

Unit– V Track geometrics, Construction and Maintenance

- Alignment- Factors governing rail alignment.
- Track Cross sections – standard cross section of single and double line in cutting and embankment. Important terms-permanent land, formation width, side drains,
- Railway Track Geometrics: Gradient, curves- types and factors affecting, grade compensation, super elevation, limits of Super elevation on curves, cant deficiency, negative cant, coning of wheel, tilting of rail.
- Branching of Tracks, Points and crossings, Turn out- types, components, functions and inspection. Track junctions: crossovers, scissor cross over, diamond crossing, track triangle.
- Station -Purpose, requirement of railway station, important technical terms, types of railway station, factors affecting site selection for railway station.
- Station yard: Classification- Passenger, goods, locomotive and marshalling yards. Function & drawbacks of marshalling yards.
- Track Maintenance- Necessity, Classification, Tools required for track maintenance with their functions, Organisation of track maintenance, Duties of permanent way inspector, gang mate and key man.

Suggested learning resources:

2. L.R. Kadiyali, Transportation Engineering, Khanna Book Publishing Co., Delhi (ISBN: 978-93-82609-858) Edition 2018
3. Khanna S.K., Justo, C E G and Veeraragavan, A., Highway Engineering, Nem Chand and Brothers, Roorkee.
4. Arora, N. L., Transportation Engineering, Khanna Publishers, Delhi.
5. Saxena S C and Arora S P, A Textbook of Railway Engineering, Dhanpat Rai Publication.
6. Birdi, Ahuja, Road, Railways, Bridge and Tunnel Engg , Standard Book House, New Delhi.
7. Sharma, S.K., Principles, Practice and Design of Highway Engineering,, S. Chand Publication, New Delhi.
8. Duggal, Ajay K. and Puri, V. P., Laboratory Manual in Highway Engineering, New Age International (P) Limited, Publishers, New Delhi.
9. Subramanian, K.P., Highway, Railway, Airport and Harbour Engineering, Scitech Publications, Hyderabad.

Course outcomes:

After completing this course, student will be able to:

- Identify the types of roads as per IRC recommendations.
- Implement the geometrical design features of different highways.
- Perform different tests on road materials.
- Identify the components of railway tracks.
- Identify the defects in railway tracks.

TRANSPORTATION ENGINEERING LAB

Course Objectives:

Following are the objectives of this course:

- To identify the types of roads as per IRC recommendations.
- To understand the geometrical design features of different highways.
- To perform different tests on road materials.
- To identify the components of railway tracks.

List of Practicals to be performed:

1	Draw the sketches showing standard cross sections of Expressways, Freeways, NH/SH, MDR/ODR
2	Flakiness and Elongation Index of aggregates.
3	Angularity Number of aggregates.
4	Aggregate impact test
5	Los Angeles Abrasion test
6	Aggregate crushing test
7	Softening point test of bitumen.
8	Penetration test of bitumen.
9	Flash and Fire Point test of bitumen.
10	Ductility test of Bitumen.
11	Visit the constructed road for visual inspection to identify defects and suggest remedial measures.
12	Prepare the photographic report containing details for experiment **No. 11.**
13	Visit the hill road constructed site to understand its components.
14	Prepare the photographic report containing details for experiment **No. 13**
15	Visit the road of any one type (flexible or rigid) to know the drainage condition.
16	Prepare the photographic report suggesting possible repairs and maintenance for experiment **No. 15**.
17	Visit to railway track for visual inspection of fixtures, fasteners and yards.
18	Prepare the photographic report containing details for experiment **No. 17.**

Suggested learning resources:

1. L.R. Kadiyali, Transportation Engineering, Khanna Book Publishing Co., New Delhi (ISBN: 978-93-82609-858) Edition 2018
2. Khanna S.K., Justo, C E G and Veeraragavan, A., Highway Engineering, Nem Chand and Brothers, Roorkee.
3. Arora, N. L., Transportation Engineering, Khanna Publishers, Delhi.
4. Saxena S C and Arora S P, A Textbook of Railway Engineering, Dhanpat Rai Publication.
5. Birdi, Ahuja, Road, Railways, Bridge and Tunnel Engg , Standard Book House, Delhi.
6. Sharma, S.K., Principles, Practice and Design of Highway Engineering,, S. Chand
7. Duggal, Ajay K. and Puri, V. P., Laboratory Manual in Highway Engineering, New Age International (P) Limited, Publishers, New Delhi.
8. Subramanian, K.P., Highway, Railway, Airport and Harbour Engineering, Scitech Publications, Hyderabad.

Course outcomes:

After completing this course, student will be able to:

- Identify the types of roads as per IRC recommendations.
- Implement the geometrical design features of different highways.
- Perform different tests on road materials.
- Identify the components of railway tracks.
- Identify the defects in railway tracks

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DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN CIVIL ENGINEERING (C03)

SEMESTER IV

COURSE TITLE	:	PRECAST AND PRESTRESSED CONCRETE
PAPER CODE	:	7378
SUBJECT CODE	:	411
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	00

Course Objectives:

Following are the objectives of this course:

- To introduce various types of precast and prefabricated concrete elements.
- To know advantages and disadvantages of precast and prefabricated concrete elements.
- To understand prestressing methods, systems for Reinforced Concrete members.
- 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

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.
4. Indian Concrete Institute., Handbook on Precast Concrete buildings.
5. Elliott, Kim S., Precast Concrete Structures, CRC Press, New York.
6. Lin, T.Y., Design of Pre-Stressed Concrete Structures, John Wiley and Sons, New York Nagarajan, Pravin., Pre-stressed Concrete Structures, Pearson Education India
7. BIS, New Delhi. IS 12592 Precast Concrete Manhole Cover and Frame, BIS, New Delhi
8. BIS, New Delhi. IS 15658 Precast concrete blocks for paving - Code of Practice, BIS, New Delhi
9. BIS, New Delhi. IS 15916 Building Design and Erection Using Prefabricated Concrete - Code of Practice, BIS, New Delhi
10. BIS, New Delhi. IS 15917 Building Design and Erection Using Mixed/Composite Construction - Code of Practice, BIS, New Delhi
11. 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:

- 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.

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN CIVIL ENGINEERING (C03)

SEMESTER IV

COURSE TITLE	:	CONSTRUCTION MANAGEMENT
PAPER CODE	:	7379
SUBJECT CODE	:	412
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	00

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Course Objectives:

Following are the objectives of this course:

- To understand the contract management and associated labour laws.
- To prepare and understand the principles involved in site layout.
- To know the procedure for scheduling of various activates in construction project.
- To understand the labour laws, procedure for arbitration, settlements.
- 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.

- 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
2. Gahlot,P.S. and Dhir, B.M Construction planning and management New Age International (P) Ltd. Publishers, New Delhi.
3. Shrivastava, U.K., Construction planning and management, Galgotia Publication Pvt Ltd. New Delhi
4. Mantri, S., The A To Z of Practical Building Construction and its Management, Satya Prakashan New Delhi
5. Khanna, O.P. , Industrial Engineering and management, Dhanpat Rai New Delhi
6. Punmia, B.C. and Khandelwal, K.K., Project Planning and Controlling with PERT And CPM, Laxmi Publications (P)Ltd.
7. Sengupta, B., Guha H., Construction Management and Planning, Tata-McGraw Hill.
8. Harpal, Singh, Construction Management and accounts, Mc-Graw Hill.
9. Sharma, S.C., Industrial Engineering and Management, Khanna Publications, New Delhi

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.

DIPLOMA WING

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

DIPLOMA IN CIVIL ENGINEERING (C03)

SEMESTER - IV

COURSE TITLE	:	MINOR PROJECT
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	02

MINOR PROJECT - Evaluation is based on work done, quality of report performance in viva-voce, presentation etc.

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DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA,BHOPAL
DIPLOMA IN CIVIL ENGINEERING (C03)

SEMESTER - IV

COURSE TITLE	:	ESSENCE OF INDIAN KNOWLEDGE AND TRADITION
PAPER CODE	:	--
COURSE CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	00

Course Content:

Basic Structure of Indian Knowledge System:

(i) वेद, (ii) उन्नवेद (आयवेद, धनुवेद गन्धवेद स्थान्नत्य आदद) (iii) वेदांग (शिक्षा कल्न ननरूत व्याकरण ज्योनतष छांद),

(iv) उन्नाइग (धर्म रीरांसा, नुराण, तकमिस्त्र)

- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case Studies.

SUGGESTED TEXT/REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1.	Cultural Heritage of In-dia-Course Material	V. Sivaramakrishna	Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2.	Modern Physics and Vedant	Swami Jitatmanand	Bharatiya Vidya Bhavan
3.	The wave of Life	Fritzof Capra	
4.	Tao of Physics	Fritzof Capra	
5.	Tarkasangraha of Annam Bhatta, Inernational	V N Jha	Chinmay Foundation, Velliarnad, Amaku,am
6.	Science of Consciousness Psychotherapy and Yoga Practices	RN Jha	Vidyanidhi Prakasham, Delhi, 2016

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