TITLE OF THE COURSE: ESTIMATION COSTING AND CONTRACT MANAGEMENT B.E., VII Semester, Civil Engineering [As per Choice Based Credit System (CBCS) scheme]			
Subject code	18CV71	CIE	50
Number of lecture hours per week	04	SEE	50
Total number of lecture hours	50	Exam hours	03

CREDITS 04

Course objectives: This course will enable students to;
1. Estimate the quantities of work, develop the bill of quantities and arrive at the Cost of civil engineering Project
2. Understand and apply the concept of Valuation for Properties
3. Understand, Apply and Create the Tender and Contract document.

Modules	Teaching Hours/ RBT LEVEL
Module-1	
Quantity Estimation for Building; study of various drawing attached with estimates, important terms, units of measurements, Abstract, Types of estimates - Approximate, detailed, supplementary and revised, Specification for Civil Engineering Works: Objective of writing specifications essentials in specifications, general and detail specifications of different items of works in buildings	**10HR L1,L2,L3**
Module-2	
Estimation of building -Short wall and long wall method - centre line method. Estimate of buildings such as residential buildings, Hostel buildings, School buildings, Commercial buildings, etc and R.C.C structures including Slab, beam, column , footings, with bar bending schedule.	**10HR L1,L2,L3**
Module-3	
Estimate of Steel truss, manhole and septic tanks. Quantity Estimation for Roads: Road estimation, earthwork fully in banking, cutting, partly cutting and partly Filling, Detailed estimate and cost analysis for roads.	**10HR L1,L2,L3**
Module-4	
Analysis of Rates : Factors Affecting Cost of Civil Works , Concept of Direct Cost , Indirect Cost and Project Cost Rate analysis and preparation of bills, Data analysis of rates for various items of Works, Sub-structure components, Rate analysis for R.C.C. slabs, columns and beams Valuation: Definitions of terms used in valuation process, Cost, Estimate, Value and its relationship, Capitalized value. Concept of supply and demand in respect to properties (land , building , facilities'), freehold and lease hold , Sinking fund, depreciation–methods of estimating depreciation, Outgoings, Processand methods of valuation : Rent fixation, valuation for mortgage, valuation of land.	**10HR L2,L3**
Module-5	
Contract Management-Tender and its Process: Invitation to tender, Prequalification, administrative approval & Technical sanction. Bid submission and Evaluation process. Contract Formulation: covering Award of contract, letter of intent, letter of acceptance and notice to proceed. Features / elements of standard Tender document (source: PWD / CPWD / NHAI /	**10HR L1,L2,L3**

NHEPC / NPC). Law of Contract as per Indian Contract act 1872 , Types of Contract, Entire contract, Lump sum contract, Item rate, % rate, Cost plus with Target, Labour. Contract Management-Post award :Basic understanding on definitions, Performance security, Mobilization and equipment advances, Secured Advance, Suspension of work, Time limit for completion, Liquidated damages and bonus, measurement and payment, additions and alterations or variations and deviations, breach of contract, Escalation, settlement of account or final payment, claims, Delay's and Compensation, Disputes & its resolution mechanism, Contract management and administration	

COURSE OUTCOME:

After studying this course, students will be able to:

1. Prepare detailed and abstract estimates for roads and building.
2. Prepare valuation reports of buildings.
3. Interpret Contract document's of domestic and international construction works

Question paper pattern:

1. The question paper will have 5 modules comprising of ten questions. Each full question carrying equal marks
2. There will be two full questions (with a maximum of three subdivisions, if necessary) from each module Each full question shall cover the topics as a module.
3. The students shall answer five full questions, selecting one full question from each module.
4. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

TEXT BOOK:

1. Datta B.N., "Estimating and costing", UBSPD Publishing House, New Delhi
2. B.S. Patil, " Civil Engineering Contracts and Estimates", Universities Press
3. M. Chakraborthi; "Estimation, Costing and Specifications", Laxmi Publications
4. MORTH Specification for Roads and Bridge Works – IRC New Delhi
5. H.S.Vishwanth., "Estimation and valuation", Sapna publications, Bangalore.

REFERENCE BOOK:

1. Kohli D.D and Kohli R.C, " Estimating and Costing",12 th Edition, S.Chand Publishers, 2014.
2. Vazirani V.N and Chandola S.P, " Estimating and costing", Khanna Publishers, 2015.
3. Rangwala, C. "Estimating, Costing and Valuation", Charotar Publishing House Pvt. Ltd., 2015.
4. Duncan Cartlidge , "Quantity Surveyor's Pocket Book", Routledge Publishers, 2012.
5. Martin Brook, "Estimating and Tendering for Construction Work", A Butterworth-Heinemann publishers, 2008.
6. Robert L Peurifoy , Garold D. Oberlender , " Estimating Construction Costs" – 5ed , Tata McGraw-Hill ,New Delhi
7. David Pratt , " Fundamentals of Construction Estimating" – 3ed ,
8. PWD Data Book ,CPWD Schedule of Rates (SoR). and NH SoR – Karnataka
9. FIDIC Contract forms
10. B.S. Ramaswamy " Contracts and their Management" 3ed , Lexis Nexis (a division of Reed Elsevier India Pvt Ltd)

TITLE OF THE COURSE: DESIGN OF RCC AND STEEL STRUCTURES
B.E., VII Semester, Civil Engineering
[As per Choice Based Credit System (CBCS) scheme]

Subject code	18CV72	CIE	50
Number of lecture hours per week	04	SEE	50
Total number of lecture hours	50	Exam hours	03

CREDITS 04

Course Learning Objectives: This course will enable students to

1. Provide basic knowledge in the areas of limit state method and concept of design of RC and Steel structures
2. Identify, formulate, and solve engineering problems in RC and SteelStructures
3. Give procedural knowledge to design a system, component or process as per needs and specifications of RC Structures like Retaining wall, Footing,, Portal Frames and Steel Structures like Roof Truss, Plate Girder and GantryGirder.
4. Imbibe the culture of professional and ethical responsibilities by following codal provisions in the analysis, design of RC and SteelStructures.
5. Provide factual knowledge on analysis and design of RC Structural elements, who can participate and succeed in competitiveexaminations.

Modules	Teaching Hours/ RBT LEVEL
PART-A	
Footings: Design of slab-beam type combined footing. **Retaining Walls:** Design of cantilever Retaining wall and counter fort retaining wall. Design of **circular water tanks** resting on ground (Rigid and Flexible base) by limit state method.	**10 HR/ L3,L4**
PART-B	
Gantry Girder: Design of gantry girder with all necessary checks. **Roof Truss:** Design of roof truss for different cases of loading, forces in members to given. **Plate Girder:** Design of welded plate girder with intermediate stiffener,bearing stiffener and necessary checks	**10 HR/ L3,L4**

Course Outcomes:
After studying this course, students will be able to:

1. StudentswillacquirethebasicknowledgeindesignofRCCandSteelStructures.
2. Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steelmembers.

Question Paper Pattern:

1. Five questions shall be asked from partA and Three questions from partB.

2. One full question should be answered from eachpart.
3. Each question carries 50marks.
4. Code books – IS 456, IS 800, IS 3370 (Part IV), SP-16, SP (6) – Steel Tables, shall be referredfordesigning. The same will be provided during examination.

Textbooks:

1. NKrishnaRaju,**"StructuralDesignandDrawingofReinforcedConcreteandSteel"**,UniversityPress
2. Subramanian N, **"Design of Steel Structures"**, Oxford university Press, NewDelhi.
3. K S Duggal, **"Design of Steel Structures"**, Tata McGraw Hill, NewDelhi

Reference Books:

1. CharlesESalman,Johnson&Mathas,**"SteelStructureDesignandBehavior"**,PearsonPublications
2. NetherCot,et.al,**"BehaviorandDesignofSteelStructurestoEC-III"**,CRCPress
3. PCVerghese,**"LimitStateDesignofReinforcedConcrete"**,PHIPublications,NewDelhi.

TITLE OF THE COURSE: RAILWAYS,HARBOUR, TUNNEL & AIRPORTS

B.E., VII Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Subject code	18CV731	CIE	50
Number of lecture hours per week	04	SEE	50
Total number of lecture hours	40	Exam hours	03

CREDITS 03

Course Learning Objectives: This course will enable students to

1.Understand the history and development, role of railways, railway planning and development based on essential

2.Learndifferenttypesofstructuralcomponents,engineeringpropertiesofthematerials,tocalculatethematerial quantities required for construction

3. Understand various aspects of geometrical elements, points and crossings, significance of maintenance of tracks.

4. Design and plan airport layout, design facilities required for runway, taxiway and impart knowledge about visual aids

5. Apply design features of tunnels, harbors, dock and necessary navigational aids; also expose them to various methods of tunneling and tunnel accessories.

Modules	Teaching Hours/ RBT LEVEL
Module-1	
Railway Planning: Significance of Road, Rail, Air and Water transports – Coordination of all modes to achieve sustainability – Elements of permanent way – Rails, Sleepers, Ballast, rail fixtures and fastenings, – Track Stress, coning of wheels, creep in rails, defects in rails – Geometric design of railways, gradient, super elevation, widening of gauge on curves- Points and Crossings(Explanation & Sketches of Right and Left hand turnouts only).	**8HR /L1,L2**
Module-2	
Railway Construction and Maintenance, Calculation of Materials required for track laying – Construction and maintenance of tracks – Railway stations and yards and passenger amenities- Urban rail – Infrastructure for Metro, Mono and underground railways	**8HR** /L1,L2,L3
Module-3	
Harbour and Tunnel Engineering: Definition of Basic Terms: Planning and Design of Harbours: Requirements, Classification, Location and Design Principles – Harbour Layout and Terminal Facilities , Coastal Structures, Inland Water Transport – Wave action on Coastal Structures and Coastal Protection Works. Tunneling: Introduction, size and shape of the tunnel, tunneling methods in soils, tunnel lining, tunnel drainage and ventilation.	**8HR** /L2,L3,L4
Module-4	
Airport Planning: Air transport characteristics, airport classification, air port planning: objectives, components, layout characteristics, and socio-economic characteristics of the catchment area, criteria for airport site selection and ICAO stipulations, typical airport layouts, Parking and	**8HR** /L3,L4

circulation area.	
Module-5	
Airport Design: Runway Design: Orientation, Wind Rose Diagram, Runway length, Problems on basic and Actual Length, Geometric design of runways, Configuration and Elements of Taxiway Design, Airport Zones, Passenger Facilities and Services, Runway and Taxiway Markings and lighting.	**8HR** /L3,L4,L5,L6

Course Outcomes: After studying this course, students will be able to:

1. Acquires capability of choosing alignment and also design geometric aspects of railway system, runway and taxiway.
2. Suggest and estimate the material quantity required for laying a railway track and also will be able to determine the hauling capacity of a locomotive.
3. Develop layout plan of airport, harbor, dock and will be able relate the gained knowledge to identify required type of visual and/or navigational aids for the same.
4. Apply the knowledge gained to conduct surveying, understand the tunneling activities.

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub- questions) from each module.
- Each full question will have sub- question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Textbooks:

1. Saxena Subhash C and Satyapal Arora, “A Course in Railway Engineering”, Dhanpat Rai and Sons, Delhi.
2. Satish Chandra and Agarwal M. M,“Railway Engineering”, 2nd Edition, Oxford University Press,New Delhi.
3. Khanna S K, Arora M G and Jain S S,“Airport Planning and Design”, Nemch and and Brothers,Roorkee.
4.CVenkatramaiah,“TransportationEngineering”,VolumeII:Railways,Airports,DocksandHarbours,Bridgesand Tunnels, Universities Press.
5. Bindra S P, “A Course in Docks and Harbour Engineering”, Dhanpat Rai and Sons, New Delhi.

Reference Books:

1. Oza.H.P.andOza.G.H.,“AcourseinDocks&HarbourEngineering”.Charotar Publishing Co.,
2. Mundrey J. S. “A course in Railway Track Engineering”.Tata Mc Graw Hill.
3. Srinivasan R. Harbour,“ Dock and TunnelEngineering”,26thEdition2013

TITLE OF THE COURSE:PAVEMENT DESIGN B.E., VII Semester, Civil Engineering [As per Choice Based Credit System (CBCS) scheme]			
Subject code	18CV732	CIE	50
Number of lecture hours per week	04	SEE	50
Total number of lecture hours	40	Exam hours	03

CREDITS 03

Course Learning Objectives: This course will enable students to

1. Gain knowledge about the process of collecting data required for design, factors affecting pavement design, and maintenance of pavement.
2. Excel in the path of analysis of stress, strain and deflection in pavement.
3. Understand design concepts of flexible pavement by various methods (CBR, IRC 37-2018, Methods, Kansas) and also the same of rigid pavement by IRC 58-2015
4. Understand the various causes leading to failure of pavement and remedies for the same.
5. Develop skills to perform functional and structural evaluation of pavement by suitable methods.

Modules	Teaching Hours/ RBT LEVEL
Module -1	
Introduction: Desirable characteristics of pavement, Types and components, Difference between Highway pavement and Air field pavement, Design strategies of variables, Functions of sub grade, sub base, Base course, surface course, comparison between Rigid and flexible pavement Fundamentals of Design of Pavements: Stresses and deflections, Principle, Assumptions and Limitations of Boussinesq's theory, Burmister two layer theory and problems on above	**10HR/** L2, L3,L4
Module -2	
Design Factors: Design wheel load, contact pressure, Design life, Traffic factors, climatic factors, Road geometry, Subgrade strength and drainage, ESWL concept Determination of ESWL by equivalent deflection criteria, Stress criteria, EWL concept, and problems on above.stress and strain flexible pavement by burmister three layer theory Flexible pavement Design:Kansas method, CBR method, IRC Method (old), CSA method using IRC-37-2018, problems on above	**10HR/** L5,L6
Module -3	
Flexible Pavement Failures, Maintenance and Evaluation: Types of failures, Causes, Remedial/Maintenance measures in flexible pavements, Functional Evaluation by Visual inspection and unevenness measurements, Structural evaluation by Benkleman beam deflection method, Falling weight deflectometer, GPR method. Design factors for runway pavements, Design methods for Airfield pavement and problems on above	**10HR/** L2, L3,L4
Module -4	
Stresses in Rigid Pavement : Types of stress, Analysis of Stresses, Westergaard's Analysis, Modified Westergaard equations, Critical stresses, Wheel load stresses, Warping stress, Frictional stress, combined stresses (using chart / equations), problems on above Design of Rigid Pavement: Design of CC pavement by IRC: 58-2015 for dual and Tandem axle load, Reinforcement in slabs, Design of	**10HR/** L4,L5

Dowel bars, Design of Tie bars, Design factors for Runway pavements, Design methods for airfield pavements, problems of the above	
Module -5	
Rigid Pavement Failures, Maintenance and Evaluation: Types of failures, causes, remedial/maintenance measures in rigid pavements, Functional evaluation by Visual inspection and unevenness measurements,joints, Reinforcement, Requirements of joints, Types of joints, Expansion joint, contraction joint, warping joint, construction joint, longitudinal joint, Design of joints	**10HR/** L4,L5,L6

Course Outcomes: : After studying this course, students will be able to:

1. Systematically generate and compile required data's for design of pavement (Highway & Airfield).
2. Analyze stress, strain and deflection by boussinesq's, burmister's and westergaard's theory.
3. Design rigid pavement and flexible pavement conforming to IRC58-2015 and IRC37-2018.
4. Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub- questions) from each module.
- Each full question will have sub- question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module.

Textbooks:

1. S K Khanna, C E G Justo, and A Veeraragavan, "Highway Engineering", Nem Chand & Brothers
2. L.R.Kadiyali and Dr.N.B.Lal, " Principles and Practices of Highway Engineering", Khanna publishers
3. Yang H. Huang , "Pavement Analysis and Design", University of Kentucky

Reference Books:

1. Yoder & witczak, "Principles of pavement design", John Wiley & Sons.
2. Subha Rao, "Principles of Pavement Design".
3. R Srinivasa Kumar, "Pavement Design" , University Press. 4. Relevant recent IRC codes

TITLE OF THE COURSE: MUNICIPAL AND INDUSTRIAL WASTE WATER ENGINEERING

B.E., VII Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Subject code	18CV741	CIE	50
Number of lecture hours per week	04	SEE	50
Total number of lecture hours	40	Exam hours	03

CREDITS 03

Course Learning Objectives: This course will enable students to;

1. Understandthevariouswaterdemandsandpopulationforecastingmethods.
2. Understandanddesigndifferentunitoperationsandunitprocessininvolvedinwastewatertreatmentprocess 3.Understand the concept and design of variousphysicochemical treatment units
4. Understand the concept and design of various biological treatmentunits
5. Understandtheconceptofvariousadvancewastewaterandlowcosttreatmentprocessesforruralareas.
6. Apply the principles of Industrial effluent treatment process for different industrial wastes.

Modules	Teaching Hours/ RBT LEVEL
Module-1	
Introduction, need for sanitation, methods of sewage disposal, types of sewerage systems, dry weather flow, wet weather flow, factors effecting dry and wet weather flow on design of sewerage system, estimation of storm flow, time of concentration flow, material of sewers, shape of sewers, laying and testing of sewers, ventilation of sewers. lowcost waste treatment; oxidation pond, septic tank, Sewer appurtenances, manholes, catch basins, basic principles of house drainage, typical layout plan showing house drainage connections,	**10HR/ L1,L2,L3**
Module-2	
Design of sewers, hydraulic formula for velocity, effects of variation on velocity, regime velocity, design of hydraulic elements for circular sewers for full flow and partial flow conditions, disposal of effluents by dilution, self purification phenomenon, oxygen sag curve, zones of purification, sewage farming, sewage sickness, numerical problems on disposal of effluents, StreeterPhelps equation	**10HR/ L1,L2,L3**
Module-3	
Waste water characteristics, sampling, significance and techniques, physical, chemical and biological characteristics, flow diagram for municipal waste water treatment, unit operations; screens, grit chambers, skimming tanks, equalization tanks Suspended growth and fixed film bio process, design of trickling filters, activated sludge process, sequential batch reactors, moving bed bio reactors, sludge digesters.	**10 HR/ L1,L2,L3**
Module-4	
Difference between domestic and industrial waste water, effect of effluent discharge on streams, methods of industrial waste water treatment; volume reduction, strength reduction, neutralization, equalisation and proportioning.	**10 HR/ L1,L2,L3, L4,L5**

Removal of organic, inorganic and colloidal solids, combined treatment methods; merits, demerits and feasibility, principles of discharge of raw, partially treated and completely treated wastes in to streams	
TITLE OF THE COURSE: HYDROLOGY & IRRIGATION ENGINEERING **B.E., VII Semester, Civil Engineering** **Module-3** **[As per Choice Based Credit System (CBCS) scheme]**	
Process flow chart, sources and characteristics of industrial waste water, treatment methods, reuse and recovery and disposal; cotton and textile industry, tanning industry, cane sugar and distilleries, dairy industry, steel and cement industry, paper and pulp industry, pharmaceutical and food processing industry.	**10HR/ L1,L2,L3**

Course outcomes: After studying this course, the students will be able to:

1. Select the appropriate sewer appurtenances and materials in sewernetwork.
2. Designthesewersnetworkandunderstandtheselfpurificationprocessinflowingwater. 3.Deisgn the varies physic- chemical treatmentunits
4. Design the various biological treatmentunits
5. Design various AOPs and low cost treatmentunits.

Reference Books:

1. CPHEEO manual on sewage treatment, Ministry of Urban Development, Government of India, New Delhi,1999
2. Mark.J Hammer, "Water & Waste Water Technology" John Wiley & Sons Inc., New York, 2008
3. Benefield R.D., and Randal C.W, "Biological Process Design for Wastewater Treatment", Prentice Hall, Englewood Chiffs, New Jersey 2012
4. Metcalf and Eddy Inc, "Wastewater Engineering - Treatment and Reuse", Publishing Co. Ltd., New Delhi, 4th Edition, 2009..

Text Books:

1. Howard S. Peavy, Donald R. Rowe, George T, "Environmental Engineering" - Tata McGraw Hill, New York, Indian Edition, 2013
2. B C Punmia, "Environmental Engineering vol-II", Laxmi Publications 2nd, 2016
3. Karia G.L., and Christian R.A, "Wastewater Treatment Concepts and Design Approach", Prentice Hall of India Pvt. Ltd., New Delhi. 3rd, Edition, 2017
4. S.K.Garg, "Environmental Engineering vol-II, Water supply Engineering", Khanna Publishers, – New Delhi, 28th edition and 2017
5. Municipal & Industrial Waste Water Engineering 7th Sem Be Civil Engineering by Hs Vishwanath (Author), Sapna Book
6. Patwardhan A.D, "Industrial Waste Water Treatment", PHI Learning Private LimitedNew Delhi

Subject code	18CV742	CIE	50
Number of lecture hours per week	04	SEE	50
Total number of lecture hours	40	Exam hours	03

CREDITS 03

Course Learning Objectives: This course will enable students to:
1. Understand the concept of hydrology and components of hydrologic cycle such as precipitation, infiltration, evaporation and transpiration.
2. Quantify runoff and use concept of unit hydrograph.
3. Demonstrate different methods of irrigation, methods of application of water and irrigation procedure.
4. Design canals and canal network based on the water requirement of various crops.
5. Determine the reservoir capacity.

Modules	Teaching Hours/ RBT LEVEL
Module-1	
Hydrology: Introduction, Importance of hydrology, Global distribution of water and Indian water availability, Practical application of hydrology, Hydrologic cycle (Horton's) qualitative and engineering representation. Precipitation: Definition, Forms and types of precipitation, measurement of rain fall using Symon's and Syphon type of rain gauges, optimum number of rain gauge stations, consistency of rainfall data (double mass curve method), computation of mean rainfall, estimation of missing data, presentation of precipitation data, moving average curve, mass curve, rainfall hyetographs.	**10HR/ L1,L2,L3**
Module-2	
LossesEvaporation: Introduction, Process, factors affecting evaporation, measurement using IS class-A Pan, estimation using empirical formulae (Meyer's and Rohwer's equations) Reservoir evaporation and control. Evapo-transpiration: Introduction, Consumptive use, AET, PET, Factors affecting, Measurement, Estimation by Blaney-Criddle equation. Infiltration: Introduction, factors affecting infiltration capacity, measurement by double ring infiltrometer, Horton's infiltration equation, infiltration indices	**10HR/ L1,L2,L3**
Module-3	
Runoff: Definition, concept of catchment, factors affecting runoff, rainfall – runoff relationship using regression analysis. Hydrographs: Definition, components of hydrograph, base flow separation, unit hydrograph, assumption, application and limitations, derivation from simple storm hydrographs, S curve and its computations, Conversion of UH of different durations.	**10 HR/ L1,L2,L3**
Module-4	
Irrigation: Definition. Benefits and drawbacks of irrigation. System of irrigation: surface and ground water, flow irrigation, lift irrigation, Bandhara irrigation. Water Requirements of Crops: Duty, delta and base period, relationship between them, factors affecting duty of water crops and crop seasons in India, irrigation efficiency, frequency of irrigation.	**10 HR/ L1,L2,L3, L4,L5**
Module-5	
Dams & Reservoir: Definition, Investigation for reservoir site, storage zones determination of storage capacity using mass curves, economical height of dam,	**10HR/ L1,L2,L3**

Basic profile of Earthen Dams & Gravity Dams. Canals: Types of canals. Alignment of canals. Definition of gross command area, cultural command area, intensity of irrigation, time factor, crop factor. Unlined and lined canals. Standard sections. Design of canals by Lacey's and Kennedy's method.	

Course outcomes: After studying this course, students will be able to:

1. Understand the importance of hydrology and its components.
2. Measure precipitation and analyze the data and analyze the losses in precipitation.
3. Estimate runoff and develop unit hydrographs.
4. Find the benefits and ill-effects of irrigation.
5. Find the quantity of irrigation water and frequency of irrigation for various crops.
6. Find the canal capacity, design the canal and compute the reservoir capacity.

Reference Books:

1. K. Subramanya, “Engineering Hydrology”, Tata McGraw Hill Publishers, New Delhi.
2. Jayarami Reddy, “A Text Book of Hydrology”, Lakshmi Publications, New Delhi.
3. Punmia and LalPandey, “Irrigation and Water Power Engineering” Lakshmi Publications, New Delhi.
4. H.M. Raghunath, “Hydrology”, Wiley Eastern Publication, New Delhi.
5. Sharma R.K., “Irrigation Engineering and Hydraulics”, Oxford & IBH Publishing Co., New Delhi.
6. VenTe Chow, “Applied Hydrology”, Tata McGraw Hill Publishers, New Delhi.
7. Modi P.N “Water Resources and Water Power Engineering”-. Standard book house, Delhi.
8. Garg S.K, “Irrigation Engineering and Hydraulic Structures” Khanna publications, New Delhi.

Text Books:

1. K. Subramanya,”Engineering Hydrology”, Tata Mcgraw Hill Publishers,New Delhi.
2. Jayarami Reddy,” A Text Book of Hydrology”,Lakshmi Publications,New Delhi.
3. Punmia and Lalpandey,”Irrigation and Water Power Engineering”, Lakshmi Publications,New Delhi.

TITLE OF THE COURSE:ENVIRONMENTAL ENGINEERING LAB **B.E., VII Semester, Civil Engineering** **[As per Choice Based Credit System (CBCS) scheme]**			
Subject code	18CVL75	CIE	50

Number of lecture hours per week	04	SEE	50
Total number of lecture hours	28	Exam hours	03

CREDITS 01

Course Learning Objectives: This course will enable students,

1. To learn different methods of water & waste waterquality
2. To conduct experiments to determine the concentrations of water and wastewater
3. To determine the degree and type oftreatment
4. Tounderstandtheenvironmentalsignificanceandapplicationinenvironmentalengineeringpractice

EXPERIMENTS	Teaching Hours/ RBT LEVEL
1. Preparation chemical reagents required for laboratory analysis by standard method.	**3HR/L3,L4,L5**
2. Determination of pH, Conductivity, TDS and Turbidity.	**3HR/L3,L4,L5**
3. Determination of Acidity and Alkalinity	**3HR/L3,L4,L5**
4. Determination of Calcium, Magnesium and Total Hardness.	**3HR/L3,L4,L5**
5. Determination of Dissolved Oxygen	**3HR/L3,L4,L5**
6. Determination of BOD.	**3HR/L3,L4,L5**
7. Determination of Chlorides	**3HR/L3,L4,L5**
8. Determination of percentage of % of available chlorine in bleaching powder sample, Determination ofResidual Chlorine and chlorine demand.	**3HR/L3,L4,L5**
9. Determination of Solids in Sewage: i) Total Solids, ii) Suspended Solids, iii) Dissolved Solids.	**3HR/L3,L4,L5**
10. Determination of optimum coagulant dosage using Jar test apparatus.	**3HR/L3,L4,L5**
11. Determination of Fluoride, Nitrate and Sulphate by spectrophotometer	**3HR/L3,L4,L5**
12. Determination of COD(Demonstration)	**3HR/L3,L4,L5**
13. Air Quality Monitoring (Demonstration)	**3HR/L3,L4,L5**
14. Determination of Sound by Sound level meter at different locations (Demonstration)	**3HR/L3,L4,L5**

Course Outcomes: After studying this course, students will be able to:

1. Acquirecapabilitytoconductexperimentsandestimatetheconcentrationofdifferentparameters.
2. Compareth eresultwithstandardsanddiscussbasedonthepurposeofanalysis.
3. Determinetypeoftreatment,degreeoftreatmentforwaterandwastewater.
4. Identify the parameter to be analyzed for the student project work in environmentalstream.

Question paper pattern:

- Two experiments shall be asked from the above set ofexperiments.

Oneexperimenttobeconductedandfortheotherstudentshouldwritedetailedprocedure.

References

1. IS codes-3025series
2. Standard method for examination of water and waste water, APHA, 20th edition

ClairSawyerandPerryMcCartyandGeneParkin,"ChemistryforEnvironmentalEngineeringand Science", McGraw-Hill Series in Civil and EnvironmentalEngineering.

TITLE OF THE COURSE: COMPUTER AIDED DETAILING OF STRUCTURE LAB

B.E., VII Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Subject code	18CVL76	CIE	50

Number of lecture hours per week	04	SEE	50
Total number of lecture hours	28	Exam hours	03

CREDITS 01

Course Learning Objectives: This course will enable students to

1. Be aware of the Scale Factors, Sections ofdrawings,Draft the detailing of RC and Steel Structuralmember.

Experiments	Teaching Hours/ RBT LEVEL
Module-1	
Detailing of RCC Structures Beams – Simply supported, Cantilever andContinuous. Slab – One way, Two way and One-waycontinuous. Staircase –Doglegged Cantilever Retainingwall Counter Fort Retainingwall	**14 HR/ L2,L3**
Module-2	
Detailing of Steel Structures Connections– Beamtobeam,BeamtoColumnbyBoltedandWeldedConnections. Built-up Columns with lacings andbattens Column bases and Gusseted bases with bolted and weldedconnections. Roof Truss – Welded andBolted Welded Plategirder&GantryGirder	**14 HR/ L2,L3**

Course outcomes: After studying this course, students will be able to:

- Prepare detailed workingdrawings

Question paper pattern:

1. Two questions shall be asked from eachModule.
2. One full question should be answered from eachModule.

Each question carries 50marks.

Textbooks:

1. NKrishnaRaju,"StructuralDesignandDrawingofReinforcedConcreteandSteel",UniversityPress
2. KrishnaMurthy,"StructuralDesignandDrawing–ConcreteStructures",CBSPublishers,NewDelhi

Reference Books:

1. SP 34: Handbook on Concrete Reinforcement and Detailing, Bureau of IndianStandards.
2. IS 13920, Ductile Design And Detailing Of Reinforced Concrete Structures Subjected To Seismic Forces - Code Of Practice, Bureau of IndianStandard.

TITLE OF THE COURSE: CIVILENGINEERINGWORKSHOPPRACTICE LAB

B.E., VII Semester, Civil Engineering

[As per Choice Based Credit System (CBCS) scheme]

Subject code	18CVL77	CIE	50
Number of lecture hours per week	03	SEE	50
Total number of lecture hours	28	Exam hours	03

CREDITS 01

Course Learning Objectives:

1. Understand the basic practical knowledge about the construction site.
2. Understand the various materials required for different construction activities.
3. Demonstration of various plumbing works and different joint in doors , windows & truss.
4. To observe the different weldings.

EXPERIMENTS	Teaching Hours/ RBT LEVEL
Visit anearbysitewhereconstructionisatinitialstageand observe for following (if necessary visit two/threetimes with a gap of a week). If drawings are availablerelate/matchactivitieswiththe drawings. a) Diggingandfilling b) Foundationpreparations c) Brick/stonemasonry d) ConcretelayingandCuring e) Layingofsewerage/sanitarylines f) Barbendingandbarlayingforcolumns,beamsandceiling. g) Onsitetestingforquality h) Onsitepreparationforconstructionwork i) Erectionandremovalofformwork,scaffolding,centering/shuttering epareabriefreportonconstructionactivities observedandmethods,tools,equipmentandmaterialsbeingused.	**6HR/ L3,L4,L**
Visita nearby site where construction is at advance stageand observe for following (if necessary visit two/threetimeswithagapofaweek): (a) Plumbing (b) Welding,fittings, (c) Plastering (d) Flooring (e) POPwork epareabriefreportonconstructionactivities observedandmaterial,tools,equipmentandmethodsbeingused.	**6HR /L3,L4,L**
Visit a nearby site where construction work is at inishingstageandobserveforfollowing(ifnecessaryvisittwo/threetimeswithagapofaweek): (a) Carpentrywork (b) Falseceilingandaluminum–glassworks (c) Whitewashing/paintingwork(surfacepreparationbeingcarriedoutfortimber/steel/plasteredsurface.) epare a brief report on construction activities observedandmaterial,tools,equipmentandmethodsbeingused.	**6HR /L3,L4,L**
Marklevelofgivenheightfromgroundlevelatdifferentlocationsintheworkshopusingwaterpipetechnique. repareaplainsmoothblock(cuboid)oftimberofgivendimensionusingsawingandplanningoperations.	**6HR /L3,L4,L**

ointwowoodenblockswiththehelpofdovetailjoint.(Usingsawingandchiselingoperations) Drilltheholeofgivendimensionatgivenlocationona metal/woodpiece. ObservedemonstrationofArcweldingandGasCuttingof metalplates.	
PLUMBING Assemble a pipe line as per given drawing using pipes ofone inch diameter, pipes of half inch diameter, nipple,reducer, union, T, elbow, tap etc. (This may involve basictasks such as marking, cutting, threading, etc anduse ofappropriate techniquesso thatwaterleakagedoesnotoccur)andthendissemblethispipeline.	**6HR /L3,L4,L**
MODELING DIFFERENT CIVIL ENGINEERING STRUCTURES such as types of Dams, types of Bridges, Multi Storey Building, towers, OHT, educational Building, Hospitals, Commercial Building, Warehouse,	**6HR /L3,L4,L**

Course Outcomes:

1. To develop basic technical knowledge of construction activities.
2. Apply basic techniques for masonry and concrete related works.
3. Identifying appropriate material required for each activity.
4. To observe technical aspects involved in workmanship of various plumbing tasks.
5. To observe technical aspects involved in safety precausions.

INDUSTRIAL PSYCHOLOGY AND ORGANISATIONAL BEHAVIOUR **B.Tech, VII Semester, civil Engineering** [As per Choice Based Credit System (CBCS) scheme]			
Subject Code	18HSM79	CIE Marks	50
Number of Lecture Hour/Week	01	SEE Marks	50
Total Number of Lecture Hours	20	Exam Hours	03
CREDITS-01			

Course Objectives: This course will enable students to:

1. Relating human psychology to science
2. Understand the human psychology
3. Understand the nature of organization and organization models
4. Understand the human social communication
5. Understand the leadership qualities

Modules	**Teaching Hours**	**Revised Bloom's**

		Taxonomy (RBT) Level
Module -1		
Introduction to I/O psychology: Major fields of I/O psychology, brief history of I/O psychology, employment of I/O psychology, ethics in I/O psychology. (Chapter-1)	**3 Hours**	**L1,L2**
Module -2		
Organisational communication: Types of organizational communication, interpersonal communication, improving employee communication skills. (Chapter-11)	**3 Hours**	**L1,L2**
Module -3		
Leadership : Introduction, personal characteristics associated with leadership, interaction between the leadership and the situation specific leader skills, leadership where we are today. (Chapter-12)	**5 Hours**	**L1,L2**
Module -4		
Group behaviour- teams and conflicts Group dynamics, factors affecting group performance, individual versus group performance, group conflicts. (Chapter-13)	**5 Hours**	**L1, L2**
Module-5		
Stress management: Dealing with the demands of life and work, stress defined, predisposition to stress, sources of stress, consequences of stress, stress reduction intervention related to life /work issues. (Chapter-15)	**4 Hours**	**L1,L2**

Course Outcomes: At the end of this course, students would be able to

1. Comprehend the knowledge and concepts of human psychology
2. know the importance of psychology
3. have insight into individual and group behavior
4. deal with people in better way
5. motivate groups and build groups

Text Book: Michael G.Aamodt, Industrial/Organizational Psychology: An Applied Approach, 6th Edition, Wadsworth Cengage Learning, ISBN: 978-0-495-60106-7.

Reference Books:

1. Blum M.L. Naylor J.C., Horper & Row, Industrial Psychology, CBS Publisher, 1968
2. Luthans, Organizational Behaviour, McGraw Hill, International, 1997
3. Morgan C.t.,King R.A.,John Rweisz &John Schoples, Introduction to Psychology, McHraw Hill, 1966
4. Schermerhorn J.R.Jr., Hunt J.G &Osborn R.N., Managing, Organizational Behaviour, John Willy