

# FACULTY OF SCIENCE AND ENGINEERING

## Fifth Semester B.E. (Civil Engineering)

**Course Code:** PEC-CE501  
**Title of the Course:** CONSTRUCTION PROJECT PLANNING AND SYSTEM:  
 Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	2	3 hrs	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Introduction: Importance of Building drawing as Engineer's Language in construction & costing. Introduction of Designing of Buildings. Site requirements, requirements of owner and Building byelaws. Climate and design consideration, orientation, recommendations of CBRI, Roorki and general principles of planning with emphasis on functional planning. Free hand dimensioned sketches of various building elements. Importance in Civil Engineering.	9 Hrs
Unit 2	Method of Drawing :Selection of scales for various drawings, Thickness of lines, Dimensioning, Combined First angle and Third angle method of projection, Abbreviations and conventional representations as per IS 1962.(ii-a ) Developing working drawings to scale as per I. S. 962 from the given sketch design and general specifications for terraced and pitched roofs.(ii-b ) Developing submission drawings to scale with location site and block plan complete.	9 Hrs
Unit 3	Definition of Projects; Stages of project planning: pre-tender planning, pre-construction planning, detailed construction planning, role of client and contractor. Process of development of plans and schedules, work break-down structure, activity lists, assessment of work content, concept of productivities, estimating durations, sequence of activities, activity utility data.	9 Hrs
Unit 4	Construction Methods for various types of Structures; Major Construction equipment; Automation & Robotics in Construction; Manpower: planning, organizing, staffing, motivation. Materials: concepts of planning, procurement and inventory control; Equipment: basic concepts of planning and organizing	9 Hrs
Unit 5	Project Monitoring & Control- Supervision, record keeping, periodic progress reports, periodical progress meetings. Quality control: concept of quality, quality of constructed structure, use of manuals and checklists for quality control, role of inspection, basics of statistical quality control. Safety, Health and Environment on project sites: accidents; their causes, effects and preventive measures, costs of accidents, occupational health problems in	9 Hrs

	construction, organizing for safety and health.	
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**Reference books:-**

1. Planning and designing of residential buildings-Y N Raja Rao and Y Subramanyam- Standards publishers distributors.
2. Building Drawing-Shah M H, Kale C M.-Tata McGraw Hill publications
3. Building Construction-Rangawala S C-Charotar publications
4. IS962 Code for practice for architectural and building drawings
5. IS 10714Part25-Technical Drawings-General principles of presentation.

# FACULTY OF SCIENCE AND ENGINEERING

## Fifth Semester B.E. (Civil Engineering)

**Course Code:** PEC-CE507  
**Title of the Course:** CONSTRUCTION PROJECT PLANNING AND SYSTEM:  
**Laboratory**

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	1	25	25	50

### LIST OF EXPERIMENTS :

1	free hand self-explanatory dimensioned sketches of various building , types of lines etc.
2	Development of plans for residential building , with load beam structure with location plan , site plan and block plan etc.
3	Developing submission drawings for single story residential building flat roof framed structure with access to terrace with location plan, site plan and block plan.
4	Graph paper design (line plans) based on various requirements for public buildings like hospital / hostel /bank/library etc.(Any two)
5	Graph paper design (line plans) based on various requirements for shopping complex /primary school building , industrial building etc.
6	Two point perspective of the single storied Residential building neglecting small building elements. (Pitched roof / flat roof ) (Any one)
7	Tracing of sheet of any one drawing sheet
8	Preparation of construction activity lists for small project along-with assessment of work content and sequence of activities estimating durations.
9	Preparation of material requirement lists along-with procurement and inventory control sheets.
10	Preparation of quality tests list of required material for small construction project as per Indian Standards.

# FACULTY OF SCIENCE AND ENGINEERING

Fifth Semester B.E. (Civil Engineering)

**Course Code:** OEC-CE 502  
**Title of the Course:** **Human Resources Development and Organizational Behavior: Theory**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	2	3 hrs	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Introduction to HR Human Resource Management - Concept, Scope and Importance, Interdisciplinary Approach Relationship with other Sciences, Competencies of HR Manager, HRM functions Human resource development (HRD) - changing role of HRM – Human resource Planning, Technological change, Restructuring and rightsizing, Empowerment, TQM, Managing ethical issues	9 Hrs
Unit 2	Organizational Behavior (OB) - Introduction to OB Origin, Nature and Scope of Organizational Behavior, Relevance to Organizational Effectiveness and Contemporary issues Personality - Meaning and Determinants of Personality, Personality development, Personality Types, Assessment of Personality Traits for Increasing Self Awareness Perception: Attitude and Value, Effect of perception on Individual Decision-making, Attitude and Behavior Motivation - Theories of Motivation and their Applications for Behavioral Change (Maslow, Herzberg, McGregor) Group Behavior and Group Dynamics - Work groups formal and informal groups and stages of group development, Team Effectiveness: High performing teams, Team Roles, cross functional and self-directed team.	9 Hrs
Unit 3	Organizational Structure & Design Structure, size, technology, Environment of organization; Organizational Roles & conflicts: Concept of roles; role dynamics; role conflicts and stress. Leadership: Concepts and skills of leadership, Leadership and managerial roles, Leadership styles and contemporary issues in leadership. Power and Politics: Sources and uses of power; Politics at workplace, Tactics and strategies.	7 Hrs
Unit 4	Human resource Planning Recruitment and Selection process, Job-enrichment, Empowerment – Job Satisfaction, employee morale Performance Appraisal Systems: Traditional & modern methods, Performance	7 Hrs

	Counseling, Career Planning Training & Development: Identification of Training Needs, Training Methods	
Unit 5	HR & MIS – Need, purpose, objective and role of information system in HR, Applications in HRD in various industries (e.g. manufacturing R&D, Public Transport, Hospitals, Hotels and service industries Strategic HRM: Role of Strategic HRM in the modern business world, Concept of Strategy, Strategic Management Process, Approaches to Strategic Decision Making; Strategic Intent – Corporate Mission, Vision, Objectives and Goals Labor Laws & Industrial Relations: Evolution of IR, IR issues in organizations, Overview of Labor Laws in India; Industrial Disputes Act, Trade Unions Act, Shops and Establishments Act	9 Hrs

**Reference books:-**

1. Stephen Robbins, Organizational Behavior, 16th Ed, 2013
2. V S P Rao, Human Resource Management, 3rd Ed, 2010, Excel publishing
3. Aswathapa, Human resource management: Text & cases, 6th edition, 2011
4. C. B. Mamoria and S V Gankar, Dynamics of Industrial Relations in India, 15th Ed, 2015, Himalaya Publishing, 15th edition, 2015
5. P. Subba Rao, Essentials of Human Resource management and Industrial relations, 5th Ed, 2013, Himalaya Publishing
6. Laurie Mullins, Management & Organizational Behavior, Latest Ed, 2016, Pearson Publications

## FACULTY OF SCIENCE AND ENGINEERING

Fifth Semester B.E. (Civil Engineering)

**Course Code:** PCC-CE 503

**Title of the Course:** TRANSPORTATION ENGINEERING I: Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	3	3 hrs	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Development and Planning – Road transport Characteristic, Classification of roads, development plans, network patterns, data collection and surveys, principles of alignment, evaluation of plan proposals. Traffic Engineering:3E`s of, traffic characteristics, Surveys, Intersection-type, layouts, design principles, Urban traffic, parking, lighting, Accidents, Traffic control Devices-marking, Sign, Signals, Regulation Motor Vehicle Act and rule	9 Hrs
Unit 2	Geometric Design – Road , road user & road vehicle characteristics, Factors affecting design standards. Cross Section elements, stopping & overtaking sight distance overtaking zones. Horizontal alignment –Curves, design of super elevation, widening, transition curves, vertical alignments, Design of summit & Valley Curves, I.R. C. standards for Geometric Design, Geometric, Geometrics of Hill Roads. Types of pavements.	9 Hrs
Unit 3	Materials: Subgrade Soil – AASHO Classification, group Index, Subgrade soil Stabilization. CBR, aggregates physical and mechanical properties & tests Bituminous materials – classification sources properties and tests. Cutback & Emulsions, IRC/IS standards, Introduction to Geotextiles Construction & Maintenance: IRC, most specifications for quality & quantity highway construction and maintenance of earthen / gravel road, WBM and WMM, Bituminous pavement, cement concrete pavement, pavement failures.	9 Hrs
Unit 4	General: Components, classification and Identification, Data Collection site Selection. Economic Span. Hydrology: Estimation of flood, discharge, water way, scour depth, depth of Foundation, Afflux, clearance and free board. Loads, Forces , Stresses – IRC Specification & code of practices, critical Combinations. Sub-Structure – (A)Types of foundations & their choice, estimation of BC of foundation strata, Open, pile and well foundation , pneumatic Caissons, cofferdams . (B)Abutment, piers & Wing-walls and their types, general design principles.	9 Hrs
Unit 5	Super Structure – Different structural forms culverts, causeways, minor and major bridges, suitability and choice, precast, post tensioned and segmental Construction. Launching, operation systems, Bearings, Architecture.	9 Hrs

	Rating and Maintenance – Methods & Techniques of rating of existing bridges Inspection, Repairs, maintenance, corrosion-causes and prevention, Aesthetics.	
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**Reference books:-**

1. Highway Engineering Khanna and Justo Nem Chand
2. Bridge Engineering by S.P.BrindraDhanpat Rai Publication
3. Bridge Engineering by S.C.RangwalaCharotar Publishing House Pvt
4. Principles and practices of Highway Engineering by S.K. Sharma Khanna Publication
5. Pavement Design : Yoder and Witzak Wiley
6. Traffic Engineering :L.R.Kadiyali Khanna Publishers

# FACULTY OF SCIENCE AND ENGINEERING

Fifth Semester B.E. (Civil Engineering)

Course Code: PEC-CE509

Title of the Course: TRANSPORTATION ENGINEERING I: Laboratory

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	1	25	25	50

LIST OF EXPERIMENTS :	
1	1Sub grade soil : CBR test
2	Sub grade soil : AASHO Classification (grouter index)
3	Aggregates: crushing value test, Los Angeles abrasion value test, shape test. (Elongation index , flakiness index) and Soundness test and Water absorption test
4	Sieve analysis of aggregates for GSB, WBM, WMM
5	Bitumen: Softening point test.
6	Bitumen : Flash and fire point test
7	Bitumen : Specific gravity
8	Bitumen : Adhesion Test.
9	Bitumen : Penetration value
10	Bitumen : Ductility Test
11	Short Field Visit



# FACULTY OF SCIENCE AND ENGINEERING

## Fifth Semester B.E. (Civil Engineering)

Course Code: PCC-CE 504

Title of the Course: STRUCTURAL ANALYSIS – I Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	3	3 hrs	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Analysis of fixed and continuous beams by theorem of three moments, effect of sinking of support. Slope deflection method as applied to indeterminate beams & continuous beams, portal frames, frame with inclined legs up to 3 degrees of indeterminacy	9 Hrs
Unit 2	Analysis of continuous beams and simple portal frames (Non sway) using Moment Distribution methods.	9 Hrs
Unit 3	Rolling loads on simply supported beams, concentrated and uniformly distributed loads, maximum B.M. and S.F. Influence lines for reactions, bending moments and shear forces in simply supported beams, cantilevers and beams with overhangs. Influence lines for forces in members of simple trusses.	9 Hrs
Unit 4	Strain energy method as applied to the analysis of redundant frames and redundant trusses up to two degrees of freedoms. Determination of deflection of trusses. Willet Mohr diagram, Castiglione theorems, Maxwell's Betti's reciprocal theorem.	9 Hrs
Unit 5	Buckling of Columns and Beams columns, Euler's and Rankin's formula. Analysis of Two- Hinged arches, S.F., B. M. and axial thrust, Parabolic arches.	9 Hrs

### Reference books:-

1. Comprehensive structural analysis by A.K. Jain, Laxmi publication
2. Theory of structure by S. RamamruthamDhanpat Rai Publication, 1993
3. Basic structural analysis By C. S. Reddy Mc Grew Hill Publication
4. Structural Analysis by Vazirani and Ratwani, Khanna Publication
5. Theory of structure by R.S. Khurmi S. Chand Publication
6. Analysis of structures by Timoshenko & Young, McGraw-Hill Publication, 1965

## FACULTY OF SCIENCE AND ENGINEERING

### Fifth Semester B.E. (Civil Engineering)

**Course Code:** PCC-CE 505  
**Title of the Course:** SURVEY II –Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	3	3 hrs	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	CURVES - Simple Compound, Reverse Curves, Vertical Curves. Simple Curves : Elements of simple curves, methods of curve ranging, obstacles in setting out curves. Compound Curves : Elements of compound Curves, setting out the curve. Reverse Curves : Elements of reverse Curves, setting out the curve. Vertical Curves: Elements of vertical curves, types, tangent correction, location of highest or lowest point. Transition Curves: Elements of transition curves, superelevation, length of transition curve, Ideal transition curve, characteristics of transition curve, setting out the transition curve.	13 Hrs
Unit 2	Field Astronomy: Introduction & Instruments & purpose, Astronomical terms, Time & conversion of time, Abbreviations, Determination of azimuth , Latitude and longitude & Examples of azimuth , Latitude and longitude	6 Hrs
Unit 3	ASTRONOMICAL SURVEYING Celestial sphere -Astronomical terms and definitions - Motion of sun and stars -Apparent altitude and corrections - Celestial co-ordinate systems -Different time systems -Nautical almanac -Star constellations -Practical astronomy - Field observations and calculations for azimuth.	11 Hrs
Unit 4	Hydrographic Surveying -Tides -MSL -Sounding methods - Location of soundings and methods -Three point problem -Strength of fix -Sextants and station pointer -River surveys -Measurement of current and discharge - Cartography - Cartographic concepts and techniques -Cadastral surveying - Definition -Uses – Legal values -Scales and accuracies.	9 Hrs
Unit 5	Theory of Errors : Introduction, types of errors, definitions, laws of accidental errors, laws of weights, theory of least squares, rules for giving weights and distribution of errors to the field observations, determination of the most probable values of quantities.	7 Hrs

#### Reference books:-

1. Surveying Vol. I, II and III by Dr. B.C. Punamia, Laxmi Publishers. New Delhi
2. Surveying and Levelling Vol. I and II by T.P Kanetkar and S.V Kulkarni, Pune VidhyarthiGruh
3. Surveying Vol. I, II and III by Dr. K.R. Arora, Standard Book House. New Delhi
4. Surveying Vol. I and II by S. K. Duggal, Tata Mcgraw Hill, New Delhi
5. Surveying and Levelling by N.N. Basak, Tata Mcgraw Hill, New Delhi

6. Surveying and Levelling by R. Agor, Khanna Publishers, New Delhi
7. Advanced Surveying by R. Agor, Khanna Publishers, New Delhi
8. Fundamentals of Surveying by Roy, S.K., Prentice Hall India, New Delhi
9. Surveying and Leveling by Subramanian, R., Oxford University Press, New Delhi
10. Remote Sensing and GIS by B Bhatia, Oxford University Press, New Delhi.
11. Remote sensing and Image interpretation by T.M Lillesand,. R.W Kiefer,. and J.W Chipman, 5th edition, John Wiley and Sons India
12. Surveying theory and practice 7th Edition by James M Anderson and Adward M Mikhail Tata McGraw Hill Publication.

# FACULTY OF SCIENCE AND ENGINEERING

Fifth Semester B.E. (Civil Engineering)

Course Code: PCC-CE508

Title of the Course: SURVEY II: Laboratory

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	1	25	25	50

LIST OF EXPERIMENTS: Any 8	
1	Setting out simple circular curve by linear method.
2	Setting out simple circular curve by angular method.
3	Setting out the compound curve.
4	Setting out the transition curve.
5	Setting out super-elevation.
6	Determination of True North by astronomical survey.
7	Determination of Latitude and longitude.
8	Solution of examples on theory of errors.
9	Solution of examples on theory of errors.
10	Study of Hydrographic Surveying equipment.

# FACULTY OF SCIENCE AND ENGINEERING

## Fifth Semester B.E. (Civil Engineering)

**Course Code:** PCC-CE 506

**Title of the Course:** DESIGN OF RCC STRUCTURES - I: Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	4	4hrs	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Introduction to the Working Stress Method of RCC design. Basic concepts in a Design for flexure, assumptions, design constants Analysis of the rectangular Section, Balance, under-reinforced and over-reinforced sections. Drawbacks and limitations of Working stress method, shear reinforcement. Design of singly reinforced, doubly reinforced beam and T-beam by WSM.	8 Hrs
Unit 2	Introduction to Limit State Design: Concept of probabilistic design and limit State design. Characteristic values, partial safety factors, stress strain Relationship stress block parameters, failure criteria, types and properties of Reinforcement, limit state of serviceability and limit state of collapse. Other Limit states. Review of IS – 456-2000. Limit state of Collapse in Shear & Bond: Design of beam for shear, shear Span, post cracking resistance, shear mechanism approach, shear failure modes and collapse loads, interaction of shear, flexure and axial force, Check for development length.. Limit state of collapse in flexure: Analysis and design of singly reinforced Rectangular section. Doubly reinforced rectangular section . Balance failure mode, primary tension failure mode and Primary compression failure mode	8 Hrs
Unit 3	Limit state of Collapse in Flexure - Analysis & Design of the Tee & L-beam Section. Limit state of collapse in compression: Analysis & design of short axially Loaded column. Columns subjected to uniaxial bending, development and use of interaction Curves. Unsupported length, End condition. Introduction to long columns. Limit state of Serviceability (i) Causes and control of cracking: Crack in plastic concrete at early age, Cracks due to temperature and shrinkage, restrain induced Cracks, Cracks due to loading. Needs for crack width control. (ii) Moment curvature relationship; deflection control of beams and One Way slabs. (no numerical calculation) (iii) Deflection control, calculation of deflection for simply supported beams acceptance criteria need of deflection control.	12 Hrs
Unit 4	Working Stress Method - Design of circular water tank with roof slab/ dome resting on ground by Approximate methods/ IS code method.	10 Hrs

	<p>Design of rectangular water tank with one-way roof slab resting on ground by Approximate method/IS code method.</p> <p>Design of prestressed slab/ rectangular beam. Prestressed Concrete :Properties of high grade materials, concepts of Prestressed concrete, methods of prestressing, losses in prestressing. Various systems for prestressing with particular reference to FreyssinedMagnelBlatton and Fifford Udall systems.</p> <p>Analysis of rectangular, T and I Section.</p>	
Unit 5	<p>Limit Stress Method - Design of one-way, simply supported, single span and cantilever slabs, and Continues slab/ beam with IS coefficients.</p> <p>Design of rectangular pad/ slopped footing for axial load.</p> <p>Design of Dog-legged and open well staircases</p>	7 Hrs

**Reference books:-**

1. Reinforced concrete structures- S.N.Sinha
2. Limit State Design of RCC Structuresby A.K. Jain, B.C.Punmiya
3. Limit State Design of RCC Strucutres: Based on IS : 800-2007 – Ashok K. Jain
4. I S 456 – 2000, I. S. 875 - , I. S. 3370 part IV
5. IS 1343
6. Reinforced Concrete Structures by N. Krishna Raju

## FACULTY OF SCIENCE AND ENGINEERING

### Sixth Semester B.E. (Civil Engineering)

**Course Code:** PEC-CE 601  
**Title of the Course:** Pavement Design –Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	General: Pavement design factors, components of flexible and rigid pavement and their functions, characteristics of highway and airfield pavement. Design parameters: Design wheel load, Standard axle load and wheel assemblies for road vehicles. Under carriage system for aircraft, type and contact pressure, contact area, imprints, computation of ESWL for flexible and rigid pavements. Load repetitions and distributions of traffic for highway and airfield, pavement, airport traffic areas, Serviceability concept.	07 Hrs
Unit 2	Material characteristics: AASHO subgrade soil classification, CBR test, North Dakota cone bearing value, plate load test for K-value, modulus of elasticity and Poisson's ratio of subgrade soils, Marshall's method of Bituminous mix design, Surface dressing, Premix carpet, Mix seal surfacing, Semi-dense carpet, Asphaltic concrete, Bituminous Macadam Binder course, Dense Bituminous Macadam Binder course, Modulus of rupture, modulus of elasticity, Poisson's ratio and coefficient of thermal expansion of concrete, Layer equivalent concepts.	09 Hrs
Unit 3	Analysis of flexible and rigid pavements: Stress, strain, deflection analysis one layer system by Boussinesq's, Two, three layer system by Burmister's, and multi layered flexible pavement system. Stress and deflections for rigid pavements due to load and temperature, influence charts, ultimate load analysis joints. Highway Pavement Design: Flexible: North Dakota cone, Design using the latest IRC code, Triaxial (Kansas), AASHTO method of design. Rigid: Design using the latest IRC code, PCA, AASHTO method of design, design of joints and reinforcements	11 Hrs
Unit 4	Airfield pavement design: 8 Syllabus –VIII SEM Civil Engineering/ Page 20 a) Flexible: FAA, US Corps of engineering, CBR, Mcleod (Canadian) b) Rigid :FAA, PCA& LCN, definitions of ACN, PCN, LCN. Calculation of LCN value. Ultimate load analysis and yield lines pattern method.	8 Hrs
Unit 5	Pavement testing and evaluation: field density, CBR, plate load test, Pavement Failures in both Flexible Pavement & Rigid Pavement - types and causes, condition surveys and surface evaluation for unevenness, rut depth, profilometers, bump integrators, Benkleman beam deflection study. Strengthening of pavements: design of flexible, composite and rigid overlays	10 Hrs

	for flexible and rigid pavements, repairs, maintenance and rehabilitation of pavements.	08 Hrs
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**Reference books:-**

Recommended Books:

1. Principles of Pavement Design by H.J.Yoder and Witczak, John wiley and sons.
2. Highway Engineering by Khanna O.P, Justo C.G., ,Nem Chand Publishers
3. Pavement Analysis and Design by Yang H. Huang 2nd Edition, Pearson Education, Inc., Pearson Prentice Hall Company.
4. Airport Engineering by G VenkatappaRao, Tata McGraw –Hill Publishing Company Ltd.
5. IRC-37(Latest Code)Guide lines for Design of Flexible Pavement
6. IRC -58-(Latest code) Guide lines for Design of Plain Jointed Rigid Pavement for highways
7. MOST Specifications for Road and Bridge Works, 1994 (Third Revision)

Reference Books: a. Airport Engineering by Khanna and Arora, Nemchand& Brothers.



## FACULTY OF SCIENCE AND ENGINEERING

### Sixth Semester B.E. (Civil Engineering)

**Course Code:**

**OEC-CE602**

**Title of the Course:**

**SOFT SKILLS AND INTERPERSONAL COMMUNICATIONS**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	0	0	3	3	3 hrs	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Soft skills: An Introduction – Definition and significance of soft skills; Process, importance and measurement of soft skill development. Self-discovery – Discovering the self; setting goals, beliefs, values, attitude, virtue. Positivity and motivation – Developing positive thinking and attitude, driving out negativity, meaning and theories of motivation, enhancing motivation level.	9 Hrs
Unit 2	Interpersonal communication – Interpersonal relations, communication models, process and barriers, team communication, developing interpersonal relationship through effective communication, Listening skills, Essential formal writing skill, Corporate communication style- assertion, persuasion, negotiation	9 Hrs
Unit 3	Public speaking – skills, methods, strategies and essential tips for effective public speaking. Teamwork and leadership skills – Concept of teams, building effective teams, concept of leadership and owning leadership skills.	9 Hrs
Unit 4	Interview skills- Interviewer and interviewee – In depth perspective, before, during and after interview, Tips for success. Presentation skill – Types, contents, audience analysis. Time management – Concept essentials, tips.	9 Hrs
Unit 5	Decision making and problem solving skills – Meaning, types and models, group and ethical decision making, problems and dilemmas in application of these skills. Conflict management – Conflict – definition, nature, types and causes; methods of conflict resolution, Stress management	9 Hrs

#### Reference books:-

1. Managing soft skills for personality development – edited by B.N.Ghosh, McGraw Hill India, 2012.
2. English and soft skills – S.P.Dhanavel, Orient Blackswan India, 2010

## FACULTY OF SCIENCE AND ENGINEERING

**Sixth Semester B.E. (Civil Engineering)**

**Course Code:** OEC-CE602  
**Title of the Course:** METRO SYSTEM AND ENGINEERING

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	0	0	3	3	3 hrs	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	General: Overview of metro system, need for metros, routine studies, basic planning and financials, Overview of world metro system, Introduction of metro act, Report of ministry of Urban development on standardization of metro system.	9 Hrs
Unit 2	Civil engineering – Overview and construction methods for elevated and underground stations, viaduct spans and bridges, underground tunnels, depots; Commercial and service building, initial survey and investigations, basic construction planning and management, construction quality and safety system, traffic integration, multi model transfer and pedestrian facilities, environmental and social safe guards, track system – permanent way, facilities management.	9 Hrs
Unit 3	Metro signaling – signaling systems, automatic fare collection, operation control center and other control systems, platform screen doors	9 Hrs
Unit 4	Mechanical and TV + AC, Rolling stock, vehicle dynamics and structure, tunnel ventilation system, air conditioning for stations and buildings, fire control system; lifts and escalators	9 Hrs
Unit 5	Metro electrification system: OHE, Traction power; Substations – TSS and ASS; power SCADA; Standby and back-up systems; green buildings, carbon credits and clean air mechanics	9 Hrs

**Reference books: -**

1. Urban transit systems and technology by Vukan R. Vuchic
2. Metro Rail in India for Urban Mobility Hardcover – 1 January 2021 by M. M. Agarwal (Author), Sudhir Chandra (Author), K. K. Miglani (Author)
3. Handbook of Research on Emerging Innovations in Rail Transportation Engineering B. Umesh Rai (Chennai Metro Rail Limited, India)
4. Railway Transportation Systems Design, Construction and Operation By Christos N. Pyrgidis
5. J.D. Fricker, & R.K. Whitford, Fundamentals of Transportation Engineering, Pearson, PH
6. J. E. Anderson, Transit Systems Theory, Lexinton Book

**FACULTY OF SCIENCE AND ENGINEERING**  
**Sixth Semester B.E. (Civil Engineering)**

**Course Code:** PCC-CE 603

**Title of the Course: Estimation and Costing –Theory**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	3	4	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	(a)Importance, purpose of quantity estimate, Mode and unit of measurement as per I.S.1200. Method and stages of estimates. Item of work and Description of an item of work. Approximate estimation of Civil Engineering works. (b)Proposal and Development of project, Nature of contract between owner &Architect/Engineer, Duties & liabilities of Architect/Engineer, Architect /Engineers normal professional services, various important terminology required like work charge establishment ,muster roll, contingencies, cent age charges, measurement book, overheads etc.	10 Hrs
Unit 2	Quantity & cost estimates. (a) Methods of detailed estimates, forms used for detailed estimates, working out the quantities of various materials required for construction of various Civil Engineering works such as Building, culverts, hydraulic structure, water supply & sanitary works, road works, retaining walls , water tanks etc. (b) Earthwork estimates in road (including hill road), canals etc. (c) Detailed estimate of steel in RCC works, bar bending schedule.	08 Hrs
Unit 3	Specifications: Purpose & principles of specifications. Types of specification, Developing detailed specifications of important items. Cost build up: purpose & principles, Importance of Current schedule rates (CSR) in cost estimate, factors affecting analysis of rates, information from National building organization. Task work, factors affecting task work, Markets rates escalation.	09 Hrs
Unit 4	Arranging works: P.W.D.as the construction agency, method of carrying out works, arranging contract works, pretender & contract planning, tender notice, acceptance of tender, essentials of contract, type of 08 Syllabus –VIII SEM Civil Engineering/ Page 20 contract, conditions of contract, contract documents, various schedules in tender documents, measurement & payment to contractor, Indian contract law, and the Engineering contract, Land acquisition act, legal aspects of various contract provisions, arbitration	08 Hrs
Unit 5	Valuation: purpose of valuation, Factors affecting value of property price & cost, market value, potential value, sentimental value, scrap value, reversionary value etc. Real Estate, net & gross return, tenure of land, valuation of land, free hold & lease hold , sinking fund, depreciation , capitalized value, methods of valuation, differed annuity, Time-cost relationship, valuation tables, rent fixation. Cost accounting: various methods classification of cost, direct & indirect charges, distribution of overheads, M.A.S.Account, issue rates & store account	10 Hrs

**REFERENCES**

1. Estimation & Costing by B.N.Dutta UBS Publications Distribution (P) Ltd.

2. Estimation & Costing (civil) by D.D.Kohli&Ar.R.C.Kohali( S.chand& company pvt.ltd.)
3. Estimating construction costs by Robert L.Peurify&GaroldD.Oberlender , Tata McGraw-Hill
4. Construction Planning & Management by P.S.Gahalot&B.M.Dhir, New Age International (P) Ltd. Publication.

**FACULTY OF SCIENCE AND ENGINEERING**  
**Sixth Semester B.E. (Civil Engineering)**

**Course Code:**

**PCC-CE608**

**Title of the Course: Estimating and Costing: Laboratory**

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	1	25	25	50

**LIST OF EXPERIMENTS: Any Eight**

1	Detailed building estimate of load bearing structure & framed structure
2	A complete set of contract document including specifications.
3	Detailed estimate of road work.
4	Rate analysis of 10 major item of building
5	Specification of 10 major item of building.
6	Valuation & rate fixing.
7	Calculation of reinforcement in RCC with bar bending schedule.
8	Study of IS-1200 code.
9	Site visit to: Study of schedule of rates & comparison with market rates & report by the students.

**FACULTY OF SCIENCE AND ENGINEERING**  
**Sixth Semester B.E. (Civil Engineering)**

**Course Code: PCC-CE 604**

**Title of the Course:                      Structural Analysis II –Theory**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Kani's Method applied to symmetrical and unsymmetrical frames with sway (Up to single bay Two story).	08 Hrs
Unit 2	Moment distribution method applied to sway frames, frame with inclined leg, gable frames. Approximate method Structural analysis for multi-storeyed frames with lateral loads (Portal and Cantilever method), Approximate methods for vertical loads i.e. Substitute frame method etc. (Max three bay three storey).	12 Hrs
Unit 3	Column Analogy method, Applications to beams, Calculations of Stiffness factors and carry Over factors for non-prismatic member, Analysis of non-prismatic fixed beams.	06 Hrs
Unit 4	a) Introduction to Flexibility Method of structural analysis, compatibility equations. Hand solution of simple beam problems. Analysis of redundant frames and trusses upto two DOR. b) Moment distribution applied to frames with sway (upto single storey two bay	12 Hrs
Unit 5	Strain energy method applied to simple composite structures (Simple problems), Introduction to basic theory of elasticity, Concept of stress, strains, strain displacement Relationship, equation of equilibrium, boundary conditions, generalized Hooks law, plane Stress and plane strain problems. Theory of photoelasticity applicable to beams. Study of various types of strain gauges, Analyses of strains by strain Guage.	07 Hrs

Text book / references

1. Theory of structure – b.c.punmia and a. K. Jain , laxmi publication
2. Theory of structure – s. Ramamrutham ,Dhanpathi Rai publication
3. Theory of elasticity- s.p.timoshanko and j.n. goodier ,mcgraw hill publication
4. Theory of elasticity – dr. Sadhu singh ,khanna publication
5. Matrix method of structural analysis- gere and wearer ,cbs publication

**FACULTY OF SCIENCE AND ENGINEERING  
Sixth Semester B.E. (Civil Engineering)**

**Course Code:**

**PCC-CE606**

**Title of the Course:**

**Structural Analysis II: Laboratory**

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	1	25	25	50

<b>LIST OF EXPERIMENTS: Any Ten</b>	
1	To find the slope and deflection of the continuous beams.
2	To find the value of flexural rigidity (EI) for a given beam & compare it with theoretical value
3	To determine the moment required to produce a given rotation at one end of the beam when the other end is (1) pinned (2) fixed.
4	To study the behavior of different types of struts and to calculate the Euler's buckling load for each case
5	To verify the Maxwell's reciprocal theorem for beam
6	To measure the strain in the cantilever beam with the help of acoustic strain gauge.
7	Study the various types of strain gauges.
8	Plotting the influence lines by making use of Muller Breslau principle.
9	Determination of deflection of trusses by Willot-Mohr's diagram.
10	Determination of material fringe value.
11	Determination of stress in beams by photoelastic method
12	To find horizontal thrust and to draw the influence line for horizontal thrust for two hinged arch .
13	To calculate horizontal deflection at roller end in two hinged arch.
14	To measure the strain in the cantilever beam with the help of electrical resistance strain gauge.
15	To determine horizontal thrust for indeterminate portal frame
16	Study of Polariscope.

## FACULTY OF SCIENCE AND ENGINEERING

Sixth Semester B.E. (Civil Engineering)

**Course Code:** PCC-CE 605  
**Title of the Course:** Design of Steel Structure –Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	4	4	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Steel as a structural material, various grades of structural steel properties, various rolled steel sections (including cold formed sections, structural pipe (tube) sections) and their properties. Introduction to I. S. 800, 808, 816, 875 etc. Design of axially loaded members: (a) Tension members, (b) Compression members Design of roof truss: Load assessment for DL, LL and WL.	10 Hrs
Unit 2	Design of simple and built up beams: Laterally restrained and unrestrained, (symmetrical as well as unsymmetrical section).Curtailment of flange plates. Introduction to plastic analysis of simply supported beam, plastic hinges, mechanism shape factors, plastic moments of resistance.	10 Hrs
Unit 3	Design of welded and riveted plate girder, design of various stiffeners, design of gantry girder. Lattice girder.	10 Hrs
Unit 4	Design of single rolled steel column section subjected to axial load and uniaxial and biaxial moment Design of axially loaded built up columns. Laced and battened columns for various types of load	7 Hrs
Unit 5	Structural Fasteners: A. Behavior of bolted and welded connections (types, Designations, properties, permissible stresses), failure of bolted and welded joints. Strength of bolt and strength of weld. Efficiency of joints. Design of simple bolted and welded connections. Moment resistant bolted and welded connection. (bending and torsion ) B. Design of connection: Beam to beam, beam to column : framed connection. Design of column bases, slab base, gusseted base and grillage foundation base subjected to eccentric loading	05 Hrs  08 Hrs

### Reference books:-

Text Books and Reference Books:-

1. Limit State Design of Steel Structures by S. K. Duggal
2. Limit State Design of Steel Structures by Subramanian
3. Limit State Design of Steel Structures by B. C. Punmia, A. K. Jain
4. IS 800:2007, Steel tables, IS 875.



# FACULTY OF SCIENCE AND ENGINEERING

Sixth Semester B.E. (Civil Engineering)

Course Code: PCC-CE607

Title of the Course: Design of Steel Structure: Laboratory

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	1	25	25	50

<b>LIST OF EXPERIMENTS: Any Five</b>	
1	Design of simple beam laterally restrained symmetrical section
2	Design of laterally restrained built up beam symmetrical section
3	Design of welded plate girder
4	Design of riveted plate girder
5	Design of single rolled steel column subjected to axial load
6	Design of single rolled steel column subjected to biaxial load
7	Design of axially loaded built up column (Laced)
8	Design of axially loaded built up column (Battened)