DEPARTMENT OF CIVIL ENGINEERING, MIT Manipal

M.Tech. CONSTRUCTION ENGINEERING AND MANAGEMENT

Program Structure (Applicable to 2019 admission onwards)

Year	FIRST SEMESTER						SECOND SEMESTER					
	Sub Code	**Subject Name**	**L**	**T**	**P**	**C**	**Sub Code**	**Subject Name**	**L**	**T**	**P**	**C**
I	MAT 5153	Statistics, Probability and Reliability	3	1	0	4	CIE 5253	Construction Contracts Management	3	1	0	4
	HUM 5151	Research Methodology and Technical Communication	1	0	3	2	CIE 5254	Construction Economics and Accounting	3	1	0	4
	CIE 5155	Construction Management Information Systems	3	1	0	4	CIE ****	Elective I	3	1	0	4
	CIE 5156	Construction Methods and Equipment	3	1	0	4	CIE ****	Elective II	3	1	0	4
	CIE 5157	Construction Engineering Project and Safety Management	3	1	0	4	CIE ****	Elective III	3	1	0	4
	CIE 5158	Operations Research and Decision Theory	3	1	0	4	*** ****	Open Elective	3	0	0	3
	CIE 5161	Project Management Lab – I	0	0	6	2	CIE 5261	Construction Materials Quality Control Lab	0	0	3	1
							CIE 5262	Construction Project Quality Practice Lab	0	0	3	1
							CIE 5268	Project Management Lab - II	0	0	3	1
		Total	**16**	**5**	**9**	**24**		**Total**	**18**	**5**	**9**	**26**
II	THIRD AND FOURTH SEMESTER											
	CIE 6098	Project Work							0	0	0	25
								Total	0	0	0	**25**

PROGRAM ELECTIVES			
CIE 5001	Construction Materials Management	CIE 5007	Organizational Behaviour and Human Resource Management
CIE 5002	Construction Quality Management	CIE 5008	Recent Advances in Concrete Technology
CIE 5003	Construction Risk Management	CIE 5009	Supply Chain Management
CIE 5004	Functional Planning Services Management	CIE 5010	Valuation Techniques in Engineering
CIE 5005	Maintenance and Rehabilitation of Structures	CIE 5011	Value Engineering
CIE 5006	Management by Values		

OPEN ELECTIVES			
CIE 5051	Advanced Strength of Materials	CIE 5053	Non - Destructive Testing of Materials
CIE 5052	Energy and Environment		

SEMESTER I

MAT 5153 STATISTICS, PROBABILITY AND RELIABILITY [3 1 0 4]

Basics of Statistics: Random Variables and its properties..Preliminary analysis of data by graphical representation, Measure of central tendency. Variables, Co-relation, Co-relation Coefficient and it's significance. Basic Probability : Probability of discrete and Continuous variables. Applications of Frequency distribution and probability in analyzing data related to process and quality control. Goodness of fit tests. Monte-Carlo Simulation. Reliability Analysis: Concept of Reliability, Risk and Safety factors. Safety Margin function, Reliability Index. FOSM method of Reliability Analysis. Application of FOSM to Linear and Non Linear Safety Margin Functions.

References:

1. Blank Leland, (1982), "Stastical Procedure for Engineering, Management and Science", Mc-Graw Hill (Series in Industrial Engineering and Management Science).
2. Ang and Tang, (1984), "Probability concepts in engineering planning and design", Vol. I and II, Wiley International.
3. Kottegoda N.T., Rosso Renzo, (1998), "Statistics, Probability and Reliability for Civil and Environmental Engineers", Mc-Graw Hill International.
4. Wackerly D. D., Mendenhall W., and Scheaffer R. L.,(2008) "Mathematical Statistics with applications",7th Edition, Thomson(Brooks/Cole).
5. Ramachandran K. M. , Tsokos C.P.,(2009) " Mathematical Statistics with applications", Academic Press.

HUM 5151 RESEARCH METHODOLOGY AND TECHNICAL PRESENTATION [1 0 3 2]

Mechanics of Research Methodology: Basic concepts: Types of research, Significance of research, Research framework, Case study method, Experimental method, Sources of data, Data collection using questionnaire, Interviewing, and experimentation. Research formulation: Components, selection and formulation of a research problem, Objectives of formulation, and Criteria of a good research problem. Research hypothesis: Criterion for hypothesis construction, Nature of hypothesis, need for having a working hypothesis, Characteristics and Types of hypothesis, Procedure for hypothesis testing, Sampling methods- Introduction to various sampling methods and their applications. Data Analysis: Sources of data, Collection of data, Measurement and scaling technique, and Different techniques of Data analysis. Thesis Writing and Journal Publication: thesis writing, journal and conference papers writing, IEEE and Harvard styles of referencing, Effective Presentation, Copyrights, and avoiding plagiarism.

References

1. Dr Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, SAGE, 2005.
2. Geoffrey R. Marczyk, David DeMatteo & David Festinger, Essentials of Research Design and Methodology, John Wiley & Sons, 2004.
3. John W. Creswel , Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, SAGE, 2004
4. Suresh C. Sinha and Anil K. Dhiman, Research Methodology (2 Vols-Set), Vedam Books, 2006.
5. Cochrain & Cox, Experimental Designs, II Edn. Wiley Publishers, 2006.

CIE 5155 CONSTRUCTION MANAGEMENT INFORMATION SYSTEMS [3 1 0 4]

Management: Definition, functions, levels. Role of Decision making in Management functions. Herbert-Simon Model of Decision Making. Role of Information in Decision Making Information: Definition, Characteristics, Types, Value; Case Examples of Construction Project Management System: Definition, Description, Types of systems, Decoupling and Control of Systems, Stress in systems. Methodology of System formulation. Case examples in Construction Project Management Prototyping: Definition, Types, Case Examples in Construction Project Management Database, DBMS: Database-Meaning, Types. DBMS- Necessity, Objective, Components. Transaction Processing Systems: Meaning of Transaction Processing, Necessity, Transaction Processing Life Cycle, Case examples in Construction Project Management Introduction to Building Information System Modeling: Meaning, Types, Application in Construction Project Management

References:

1. Gordan Davis B., (1989) "Management Information Systems. Conceptually foundation, Structure and Development", McGraw Hill Book Company, International Edition.
2. Parker Charles S., (1989) "Management Information Systems: Strategy and Action", McGraw Hill Publication Company.
3. Sadgopan S., (1998) "Management Information Systems", Prentice Hall India Ltd., New Delhi.
4. Murdick Robert C., Ross Joel E., (1990) "Management Information Systems for Modern Management", Prentice Hall India Ltd., New Delhi
5. Scott George C., (1986) "Principles of Management Information Systems", McGraw Hill Book Company, International Students Limited

CIE 5156 CONSTRUCTION METHODS AND EQUIPMENT [3 1 0 4]

Conventional and modern methods of construction of building elements, different stages of construction, types of form works, elements of precasting and prefabricated construction, use of prestressing. General data on mechanized construction equipments. Construction equipments and their characteristics, performance and application to the building process. Excavating and Earthmoving equipments and their performance. Drilling, Blasting & Processing equipments. Asphalt and concrete plants & Equipments.

References:

1. Mahesh Varma, (1987), "Construction Equipment and its Planning and Application" Metropolitan Book Co.(P) Ltd.
2. R. L. Peurifoy, W. B. Ledbeffe, (1985), "Construction Planning, Equipment and Methods", McGraw Hill Book Company.
3. James F. Russell, (1985), "Construction Equipment" Reston Publishing Company, Inc.
4. Prof. S. S. Ataev, (1985), "Construction Technology" Mir Publishers Moscow.
5. M. Antill and Paul W.S. Ryan, (1982), "Civil Engineering Construction" McGraw Hill Book Co ; Sydney.

CIE 5157 CONSTRUCTION ENGINEERING PROJECT AND SAFETY MANAGEMENT [3 1 0 4]

Construction Projects- Concept, Project Categories, Characteristic of projects, Project life cycle phase, Project Feasibility Reports, Project planning, Scheduling, Pert Network: CPM Network (A-O-A Network)-

Calculation of floats, Precedence network, Time Cost Relationship, Allocation of resources, Project Control Methodology: Project updating using CPM network. Construction Safety - meaning and Scope, Current Situation in Safety of Construction. Construction Safety - Safety clauses in contract document, Fire prevention and Control, Role of various parties on Construction Safety Management, Safety remedies for common hazards, Safety in Use of Construction equipments, Human Factors in Construction Safety management, Motivation on Safety in construction..

References:

1. Tenah Kwaku A./Gvevara Iose M., (1985), "Fundamentals of construction management & organization", Rertan publishing Co. Inc.
2. Raina V.K., (1988), "Construction Management practice", Tata – McGraw Hill publishing co. Ltd.
3. George 1. Ritz, (1994), "Total Construction Project Management", McGraw - Hill Inc.
4. Seetharaman. S., (1997), "Construction Engg. and Management", Umesh Publication.
5. Vaid K. N.,(1988) "Construction Safety Management" National Institute of Construction management, Mumbai.

CIE 5158 OPERATIONS RESEARCH AND DECISION THEORY [3 1 0 4]

Introduction Operation Research. Decision Theory: Decision strategies, Formulation of Decision criteria, Decision trees. Game Theory: Classification of games. Solution to 2 x 2, 2 x n and m x n pay - off matrix:- Graphical, algebraic and linear programming methods.Linear Programming: Formulation, general and standard forms of LPP, dual of LPPs. Solution methods. Transportation Models: Introduction, Methods of finding initial and optimal solution. Assignment Models: Introduction and Solution. Dynamic Programming: Introduction, solution of Discrete DPP, Solution of LPP by Dynamic Programming. Network Analysis: Minimum Span Problems, Shortest- Route problems, Maximal- Flow Problems. Queuing Theory/Waiting Line Theory: General structure of a queuing system – operating characteristics of queuing system, Waiting line models, Post optimality analysis.

References:

1. Bronson Richard, (1983) Theory and Problem of operations Research Schaum's outline series, McGraw Hill Book Co,
2. Hamdy Taha A., (1989) Operations Research: An Introduction, Maxwell Macmillan International Edition, IV Edition
3. Shenoy G.V., Srivastav U.K., Sharma S.C. (1988) Operations Research for Management - Wiley Eastern Limited
4. Gupta M.P., Sharma J.K. (1987) Operations Research for Management National Publishing House, II Edition
5. Mcclain John O. and Thomas Joseph (1987) Operations Management Prentice Hall of India Private Limited, New Delhi

CIE 5161 PROJECT MANAGEMENT LAB-1 [0 0 6 2]

Planning of Construction Projects- Work Break Down Structure, Estimation and Costing, Project Scheduling, Project Monitoring - Exercise through Example Projects and Practical Site Studies.

References:

1. Raina V. K., (1988), "Construction Management practice", Tata – McGraw Hill publishing co. Ltd.
2. Punmia B.C. and Khandelwal K.K., (1989), "Project Planning and Control with PERT. and CPM", Laxmi Publication II Edn..
3. K K Chitkara, (1999), "Construction Project Management", Tata-McGraw Hill publishing co. Ltd.Publication.
4. AICTE Continuing Education Programme, "Quantitative Methods in Construction Management"

SEMESTER II

CIE 5253 CONSTRUCTION CONTRACTS MANAGEMENT [3 1 0 4]

Introduction to contracts: Definitions, Essentials, Salient features, Discharging and Documents for an Engineering Contract; Classification and Applicability of of the various types of contracts. Tendering process: Definitions, List of Documents, Preparation and its submission, Receipt, Evaluation and Award of contract. Issues in tendering process. Administration/Performance of contract: Responsibilities, Monitoring and Quality control/assurance, Settlement of claims Breach of contract: Definition and Classification, Common Breaches. Dispute resolution: General Methods for dispute resolution, Arbitration and Adjudication by courts. Conciliation, Dispute Resolution Boards. Arbitration Process. International contracts / contracts with international funding: International Competitive Bidding and Applicable Law and Settlement of Disputes, International Arbitration.

References:

1. Prakash V. A.,(1997) "Contracts Management in Civil Engineering Projects", NICMAR
2. Patil B. S.,(2009) "Civil Engineering Contracts and Estimates", University Press.
3. John G. Betty(1993/ Latest Edition) "Engineering Contracts", McGraw Hills.
4. Vasavada B. J.,(1997) " Engineering Contracts and Arbitration", (Self Publication by Jyoti B.` Vasavada).
5. Vaid K. N., (1998)"Global perspective on International Construction Contracting Technology and Project Management", NICMAR, Mumbai.

CIE 5254 CONSTRUCTION ECONOMICS AND ACCOUNTING [3 1 0 4]

Economics:Industrial Development - Matters related to Construction Industry- Market Demand and Supply - Theory of Production – Economics of Scale- Cost Concepts - Theory of Costs and Break Even Analysis - Its importance- Contracts. Financial Accounting : Journal, Ledger, Trial Balance and Bank Reconciliation Statement. Preparation of financial statements Its nature, importance and interpretation. Management Accounting: Techniques or Tools of Management Accounting - Comparative and Common sized Balance sheet - Ratio analysis. Financial Management: Investment evaluation- capital budgeting, Budgets and Budgetary Control. Business finance: Source of finance - short term and long term – Working Capital. Accounting through computers

References:

1. Varshney R L, Maheswari K. L., (2005), 'Managerial Economics', Sultan Chanda and Sons, New Delhi.
2. H. L. Ahuja, (2005), 'Business Economics', S. Chand and Co., New Delhi.
3. M. C. Shukla and T.S. Grewal, (2002), 'Advanced Accounts', S.Chand and Co., New Delhi.
4. Pandey LM., (1998), 'financial Management', Vikas Publishing House, New Delhi.
5. Khan M. Y., and Jain P.K., (1992) 'financial Management', Tata McGraw Hill, New Delhi.

CIE 5261 CONSTRUCTION MATERIALS QUALITY CONTROL LABORATORY [0 0 3 1]

Concrete mix design, Tests on fiber reinforced concrete, Tests on concrete with different binders, Tests related to self compacting concrete, Pretensioning System, Non destructive tests, Corrosion tests.

References

1. Raju N Krishna, (2004) "Design of concrete mixes", CBS Publishers, New Delhi.
2. Gahlot P S, "Concrete mix design", Indian society for technical education, Mysore.
3. Krishnamurthy S , Bhattacharjee B, "Concrete mix design and recent technology of placing concrete", Indian society for technical education, Mysore.
4. Kishore Kaushal, (1992) "Method of concrete mix design with chemical admixtures and for pumped concrete", Standard Publishers, Delhi.
5. Rathore Shailendra Singh, (2003) "Computer aided concrete mix design", Allied Publishers Delhi.

CIE-5262 CONSTRUCTION PROJECT QUALITY PRACTICE LABORATORY [0 0 3 1]

Case Studies of Construction Project Standard Operating Procedures (SOP), Project Quality Assurance(QA) Models, Exercises of SOP and QA Site Visits to ongoing Construction Projects.

References:

1. Constructions Operations Manual of Policies and Procedures, Sidney M .Levy, Andrew.M. Civetello, McGrahill Educations, 2016.
2. Standard Operating Procedure Manuals of Construction Organizations
3. Quality Assurance Manuals of Construction Organizations

CIE 5268 PROJECT MANAGEMENT LAB-2 [0 0 3 1]

Introduction to Project Management Softwares- MS Project & Primavera. Working on Practical Projects

References:

1. Project Planning and Control using Oracle Primavera P6, Paul Harris, Eastwood Harris Pty Ltd., Victoria, Australia, 2018
2. Construction Scheduling with Primavera P6, Jongpil Nam, AuthorHouse UK Pvt.Ltd., Bloomington, USA,2016
3. Project Planning and Control using Microsoft Project, Paul Harris, Eastwood Harris Pty Ltd., Victoria, Australia, 2018
4. Construction Scheduling with Microsoft Project, Jongpil Nam, AuthorHouse UK Pvt.Ltd., Bloomington, USA,2016
5. Reference Manuals

SEMESTER III and IV

CIE 6098 PROJECT WORK [0 0 0 25]

Students are required to undertake innovative and research oriented projects, which not only reflect their knowledge gained in the previous two semesters but also reflects additional knowledge gained from their own effort. The project work can be carried out in the institution/ industry/ research laboratory or any other competent institutions. The duration of project work should be a minimum of 36 weeks. There will be a mid-term evaluation of the project work done after about 18 weeks. An interim project report is to be submitted to the department during the mid-term evaluation. Each student has to submit to the department a project report in prescribed format after completing the work. The final evaluation and viva-voice will be after submission of the report. Each student has to make a presentation on the work carried out, before the departmental committee for project evaluation. The mid-term & end semester evaluation will be done by the departmental committee including the guides.

PROGRAM ELECTIVES

CIE 5001 CONSTRUCTION MATERIALS MANAGEMENT [3 1 0 4]

Integrated material Management: Meaning, Functions, and Advantages. Selective Control, Codification and Standardization. Material planning and budgeting, Material requirement Planning. : Objectives, Functions, Purchase Systems, Price forecasting, Purchasing strategies under fluctuating Prices, Purchasing Capital equipment. Source selection.Stores an d Inventory management: Principles and Practice, Different inventory costs, Static risk model, EOQ, Practical systems, - P and Q systems, Probability based inventory control, Just In Time inventory method, Introduction to Value Stream Mapping and Supply Chain Management.

References:

1. Gopal Krishnanan P., Sundaresan M., (2010) "Material Management Integrated Approach", Prentice Hall India, New Delhi.
2. Datta A.K., (2010) "Material Management and Inventory Control: Principles and Practice", Jaico Publishing House, Bombay.
3. Shah N.M., (2000) "Integrated Concept of Material Management", Tata Mc Graw Hill.
4. Michael R. Leenders, Fearn, (1977) "Purchasing and Material Management", D.B. Tarporevale Sons and Co., Bangalore.
5. Zipkin, Paul H., (2000) "Foundations of Inventory Management", McGraw Hill International

CIE 5002 CONSTRUCTION QUALITY MANAGEMENT [3 1 0 4]

Foundations of Total Quality Management: Understanding quality, TQM philosophy: Concept of Deming, Juran, Crosby, Imai, Ishikawa, Taguchi, Shingo philosophies. Models and frame works. TQM Tools: An overview of Flowcharts, Check sheets, Histogram, Cause and effect diagrams, Pareto diagram, Scatter diagram and Control charts. Planning: Policy, Strategy and goal deployment, Partnership and resources, Design for quality. Performance: Measurement frame works, Self-assessment audit and review, benchmarking. Process management, Redesign, Quality management system, Quality assurance.

People: Human resource management(Introduction only), Cultural change, Innovation and learning, Leadership and commitment. Implementing TQM: TQM and management of change, Planning and implementation of TQM, Sustained improvement, TQM models in practice.ISO 9000 quality systems, Six sigma practice. Customer-Supplier Chain, Continuous improvement. ISO 14001 quality systems.

References:

1. Oakland John S (2006) " TQM", Text with cases, Butterworth-Heinemann, Oxford.
2. Zairi Mohamed, (1992) "Total Quality Management For Engineers", Aditya Books, NewDelhi.
3. Feigenbaum Armand V., (1991) "Total Quality Control", McGraw Hill Inter- national Edition.
4. Dalela Suresh, Saurabh, (1997) "ISO-9000 A Manual for Total Quality Management", S.Chand, NewDelhi.
5. Woodside Gayle, Aurrichio Patrick (2000) " ISO 14001,Auditing manual" Mc-graw Hill, New Delhi.

CIE 5003 CONSTRUCTION RISK MANAGEMENT [3 1 0 4]

Project Risk Management Definition, Role of Project Risk Management in Project Management, Good Risk Management Practice, Critical Success Factors for Project Risk Management, Definiation of Risk, Individual Risks and Over all project Risks, Stake holders Risk Attitude, Responsibility for Project Risk Management, Project Manager's Role, Project Risk Management Process, Critical Success Factors, Barriers, Tools, Documentation Process, Qualitative Risk Analysis, Risk Responses, Monitoring and Controlling Risks.

References:

1. Flanagan Roger, Norman George, 'Risk Management and Construction', Blackwel Science Ltd., Oxford, 1999
2. Chapman Robert J., 'The Rules of Project Risk Management: Implementation Guide lines for Major Projects', Routledge, London, 2014
3. Revere John J., 'Construction Risk: A Guide line to Identification and Mitigation of Construction Risks', Marketing Technologies, London, 2003
4. Meyer Christian, Quell Peter, 'Risk Model Validation', Risk Books, London, 2016
5. Smith Nigel J., Merena Tony, Jobling Paul, ' Managing Risks in Construction Projects', Willey Blackwell, Network.

CIE 5004 FUNCTIONAL PLANNING SERVICES MANAGEMENT [3 1 0 4]

Components of urban forms and their planning, Concepts of neighborhood unit, Street system and layout in a neighborhood. Functional planning buildings: Optimization of space, Spatial Synthesis graphical techniques, heuristic procedures. Space requirements and relationships for typical buildings, like residential offices, hospitals, etc. Standard fire, fire resistance, classification of buildings, means of escape, alarms, etc.

Engineering services in a building as a systems. Lifts, escalators, cold and hot water systems, waster water systems, and electrical systems. Building Maintenance: Scheduled and contingency maintenance planning. Maintenance standards. Economic maintenance decisions. Environmental factors: Thermal performance of buildings; Comfort factors and measurements; climatic design; Solar control and shading devices, Louver design, ventilation. Introduction to lighting: units of light, colour lamps, luminaries, Daylight design of general lighting schemes; Energy management and lighting; acoustical design of auditoria and noise control in buildings.

References:

1. Chiara Joseph, Koppellman Lee, (1975) 'Urban planning and design criteria', Van Nostrand Reinhold, New York.
2. Catanese Anthony J , Snyder James C, (1979) 'Introduction to urban planning', MGH, NewYork.
3. Building Services Research Information Association, (1987) 'Building services material hand book', E and FN Span, London.
4. Chadderton David V, (1991) 'Building services engineering', E and FN Span, London.
5. Watson Lee, (1990) 'Lighting design handbook', Mc Graw Hill, New York.

CIE 5005 MAINTENANCE AND REHABILITATION OF STRUCTURES [3 1 0 4]

Performance of construction materials and components in services; Causes of deterioration; preventive measurements and maintenance; principles of assessment of weathering and durability.

Deterioration process in concrete structures, Construction and design defects. Diagnostic methods, Load testing and nondestructive testing. Causes and prevention of cracks in masonry structures, Corrosion in structures, process and prevention, Fire damage of buildings. Repair materials, cement aggregate, polymer and construction chemicals. Management of concrete for durability. Damage assessment and restoration techniques, case studies of restoration works, buildings, bridges, water retaining structures, marine structures.

Special repairs, maintenance inspection and planning, Budgeting and management.

References:

1. Emmons Peter H, (2001) 'Concrete Repair and Maintenance illustrated', Galgotia Publications Pvt. Ltd., New Delhi.
2. Allen R.T.L., Edwards S. C., (1987) 'The Repair of Concrete Structures', Blackie & Sons Ltd., Glasgow, London.
3. Peter H Emmons,(200 I), "Concrete Repair and Maintenance Illustrated', Galgotia Publications Pvt. Ltd., New Delhi.
4. Allen R.T.L ., Edwards S. C., (1987)'The Repair of Concrete Structures', Blackie & Sons Ltd., Glasgow, London.

CIE 5006 MANAGEMENT BY VALUES [3 1 0 4]

Values for Indian Managers. Anatomy of ethico-moral management from self to SELF: The ascent from pettiness to dignity. Appraisal of Management by value programmes. Socio-Cultural change and managers travails. Social values and Individual attitudes, Work ethic. India's vision of Humanism. Heirarchism as Organisational Value. Rediscovering Indian Psychology for Managers. Leadership modeling. Mental health of a manager.

References:

1. Chakraborty S.K., (1991) "Management by Values: Towards Cultural congruence", Oxford University Press, New Delhi.
2. Chakraborty S.K., (1987) "Managerial Effectiveness and Quality of Work life: Indian Insights", Tata-McGraw Hill.
3. Monappa A., (1972) "Ethical Attitudes of Indian Managers", All India Management Association.

CIE 5007 ORGANIZATIONAL BEHAVIOUR & HUMAN RESOURCE MANAGEMENT [3 1 0 4]

Organizational Behaviour: Nature of organizational behaviour: Defininition key elements, scope, model. Stages of evolution of OB, Researches in OB. Foundations of Individual Behaviour: Personality, Perception, Learning Attitudes, Values and Job satisfaction, Concepts of motivation. Foundations of Group Behaviour: Small groups in an organization, Leadership, Power and Politics, Communication, Conflict. Organization: Organization culture, work stress, organizational changes and development. Human Resource Management: Definition, Scope, Objectives' HR Planning Job Analysis and Design. Recruitment, Selection, Placement, Training Performance appraisal, Employee remuneration and Benefits. Industrial relations: Trade unions, Disputes and their resolution.

References

1. Aswathappa A., (2000) "Organizational Behaviour: Texts and cases Himalaya Publishing House, Mumbai.
2. Hersey Paul, Kenneth Blanchard H., "Management of Organizational Behaviour: Utilising Human Resources", Prentice Hall India Ltd. Edition, New Delhi.
3. Davis Keith, "Human Behaviour at work: Organizational Behavior", Tata-McGraw Hill, New Delhi.

4. Suri S.K. (1988) "Human Resource Development and Productivity: New Perspective", National Productivity Council, Delhi.
5. Rao Subba P, (1999) Essential of HRM and Industrial Relations, "Text cases and Games", Himalaya Publishing house, II Edition.

CIE 5008 RECENT ADVANCES IN CONCRETE TECHNOLOGY [3 1 0 4]

Introduction to Recent Advances in Concrete & Review of Conventional/Normal Concrete: Merits and Demerits of concrete, Features of Recent Advances in Concrete, Types of Concrete related tests, Production and use of concrete. High Performance Concretes: Classification, general properties, Advantages, Disadvantages, Applications, Description of types, Guidelines for Mix design and use of following concretes:

Light weight concrete, High strength concrete, Ultra-high strength concrete (reactive powder concrete), High workability concrete/Self compacting concrete, Fiber reinforced concrete, Polymer-concrete composites. Special Concretes: General properties, Advantages, Disadvantages, Applications, Concreting practices, Guidelines for Mix design and use of -Heavy weight concrete, Shrinkage compensating concrete, Mass concrete, Roller compacted concrete. Durability of Concrete: Deterioration processes – Physical, Chemical, Environmental & Biological; Measures for ensuring durability, Corrosion of reinforcing steel, protective measures. Testing and Quality Control of Concrete: Classification of test methods, In-situ, Non-Destructive & Partially–Destructive tests for fresh concrete, hardened concrete and durability of concrete.

References:

1. P. Kumar Mehta And Paulo J. M. Moteiro, (2005), "Concrete – Micro Structure, Properties and Materials", Indian Concrete Institute, Chennai and Prentice Hall & Mc Graw-Hill in USA.
2. Neville A. M. And Brooks J. J, (2000), "Concrete Technology", Addison Wesley Longman Ltd.
3. M. L. Gambhir, (2008/ Latest Edition), "Concrete Technology"
4. M. S. Shetty, (2009 / Latest Edition), "Concrete Technology"

CIE 5009 SUPPLY CHAIN MANAGEMENT [3 1 0 4]

Supply chain, Objectives, importance, ,decision phases , supply chain enablers. Achieving strategic fit and scope, performance measures, drivers and measures. Transportation and Strategies. Network design and Optimization. Supply chain in Inventory management, Bull-Whip effect. Green Supply chain.

References:

1. Supply Chain management- Strategy, Planning and Operation" Sunil Chopra, Peter Meindel – Fifth Edition, Pearson- Prentice Hall
2. Supply chain – Text and cases, Janat shah, Pearson publication
3. Green Supply Chains- An action manifesto, Stuart Emmet and Vivek Sood, Wiley Publication.
4. ERP demystified, Alexis Leon, Tata Mcgraw- Hill education private limited, second edition

CIE 5010 VALUATION TECHNIQUES IN ENGINEERING [3 1 0 4]

Purpose of valuation, Different forms of values, Outgoings: Municipal & Govt. Taxes, insurance, Loss of rent, collection charges, sinking fund, Annual repairs & maintenance. Depreciation. Methods of calculation of depreciation., Year's Purchase, Capitalized value, Obsolescence, Amortization. Methods of valuation: Open land valuation, Factors affecting intrinsic values of land, Comparative method, Abstractive method, Belting method. Rent: Definition, Forms of rents. Cost of structure, BIS rules for measuring plinth area and cubical contents. Valuation of land with buildings: Rental method, Land and building method, Valuation on profit basis, Direct comparison of capital value, Residual or Development method. Valuation of agricultural/farm lands, Rights and Liabilities of Lessor & Lessee, Leasehold properties, freehold Properties. Easements : Self-imposed, Legally created, Dominant and Servient heritage Effect of easements on valuation. Market : Real Estate market and market value, fair market value, open market value , affecting parameters

References:

1. Banerjee D.N (1998) " Principles and Practice of Valuation ". Eastern law house
2. Roshan H. Namavathi,(2001) "Professional Practice " Lakhani Book Depot.
3. Mitra A.K., (1986)"Theory and Practice of Valuation " Eastern law house
4. Rao Gopinath C H,(2002) "Valuation Practices of Immovable Properties." Edition 12, Publisher, C H Gopinath Rao, Chennai.
5. Tedkay, (l992)'Asserssment and Renovation of Concrete Structures', Longman Scientific & Technical, Harlow, England.

CIE 5011 VALUE ENGINEERING [3 1 0 4]

Introduction and background of value Engineering. Hurdles in value Engineering. Value Engineering Job Plan. Functional Analysis. Creative thinking, Cost modeling, Life cycle costing, Project work, Worksheets, Guidelines, Checklists. Value Engineering Case studies.

References:

1. Zimmerman Larry W., Hart Glen P., (1988) "Value Engineering", CBS Publishers, New Delhi.
2. Iyer S.S., (1996) "Value Engineering", New Age International.
3. Krishnan P., Saxena K.R., (1995) "Value Engineering in Project Management", Oxford and IBH.
4. Vittal M.S., (1993) "Value Engineering", System Consultancy Service, Bangalore.
5. AICTE, "Value Engineering", New-Delhi, 1990.

OPEN ELECTIVES

CIE 5051 ADVANCED STRENGTH OF MATERIALS [3 0 0 3]

Torsion: Torsion of non-circular and thin walled sections. Unsymmetrical bending of straight beams, thin walled beam cross sections - shear centre for thin walled sections.

Bending of curved beams: crane hooks, closed rings - correction factor for flanged cross sections. Bending of beams curved in plan. Beams on Elastic foundation.

References:

1. Srinath L. S , Advanced Solid Mechanics TMH., New Delhi.
2. Boresi A. P., and Sidebottom O. M., Advanced Mechanics of Materials, John Wiley and sons in N.Y.
3. Den Hartog, Advanced Strength of Materials, McGraw Hill, N.Y.

CIE 5052 ENERGY AND ENVIRONMENT [3 0 0 3]

Introduction: Energy consumption, crisis, Policies, Laws and Principles. Renewable sources of energy and Environmental aspects: example: solar energy, Hydro power, etc Non-renewable sources of energy and Environmental aspects –, coal, oil, natural gas.Global and regional impacts of Climate change: Greenhouse effects, global warming and Acid rain

References:

1. G.D.Rai. "Non-Conventional energy sources" Khanna publishers.
2. D P Kothari, et.al., "Renewable energy sources and Emerging Technologies".
3. Wilber L.C. "Hand book of Energy Systems" Engg Wiley & Sons 1989.
4. Rao and Parulekar B.B. Energy Technology- Non-conventional Renewable & Conventional, Second Edition Khanna Publication 1977.

CIE 5053 NON- DESTRUCTIVE TESTING OF MATERIALS [3 0 0 3]

Introduction, Liquid Penetrant Tests, Magnetic particle testing, Acoustic Emission Test, Ultrasonic test, Electromagnetic Testing Method, Leak Testing Methods, Radiographic Testing Method.

References

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2. R. Halmshaw, Non-destructive Testing, 2nd edition, Edward Arnold, London, 1991.
3. McGonnagle W. J., Non-destructive testing, Gordon & Beach Science, New York, 1983.