



Dr.M.G.R
Educational and Research Institute
Univeristy
 (Decl. U/S 3 of UGC Act 1956)
DEPARTMENT OF CIVIL ENGINEERING

M.Tech. Civil Engineering (Part Time)
Curriculum & Syllabus
2013 Regulation

M. Tech. CONSTRUCTION ENGINEERING AND MANAGEMENT

I SEMESTER						
S.No.	Sub. Code	Subject Name	L	T	P	C
1.	MMA130015	Applied Mathematics for Construction Engineers	3	1	0	4
2.	MCE13C002	Construction Equipments	3	1	0	4
3.	MCE13C003	Modern Construction Materials	3	1	0	4
4.	MCS13AL01	Computer Application Lab	0	0	2	1
TOTAL			9	3	2	13

II SEMESTER						
S.No.	Sub. Code	Subject Name	L	T	P	C
1.	MCE13C004	Project Formulation and Appraisal	3	1	0	4
2.	MCE13C005	Advanced Concrete Technology	3	1	0	4
3.	MCE13C006	Construction Project Management	3	1	0	4
TOTAL			9	3	0	12

III SEMESTER						
S.No.	Sub. Code	Subject Name	L	T	P	C
1.	MCE13C007	Advanced Construction Techniques	3	1	0	4
2.	MCE13C008	Computer Applications in Construction Engineering and Planning	3	1	0	4
3.	MCE13C009	Shoring, Scaffolding and Formwork	3	1	0	4
TOTAL			9	3	0	12



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IV SEMESTER						
S.No.	Sub. Code	Subject Name	L	T	P	C
1.	MCE13C001	Contract Laws and Regulations	3	1	0	4
2.		Elective - I	3	1	0	4
3.		Elective- II	3	1	0	4
4.	MCE13SL01	Structural Engineering Lab	0	0	2	1
TOTAL			9	3	2	13

V SEMESTER						
S.No.	Sub. Code	Subject Name	L	T	P	C
1.		Elective III	3	1	0	4
2.		Elective IV	3	1	0	4
3.		Elective V	3	1	0	4
4.	MCE13CL01	Project Work (Phase I)	0	0	2	1
TOTAL			9	3	2	13

VI SEMESTER						
S.No.	Sub. Code	Subject Name	L	T	P	C
1.	MCE13CL02	Project Work (Phase II)	0	0	24	12
TOTAL			0	0	24	12

TOTAL NO OF CREDITS = 13 + 12 + 12 + 13 + 13 + 12 = 75



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LIST OF ELECTIVES

S.No.	Sub. Code	Subject Name	L	T	P	C
1.	MCE13CE01	System Integration in Construction	3	1	0	4
2.	MCE13CE02	Management Principles and Risk Analysis	3	1	0	4
3.	MCE13CE03	Construction Personnel Management	3	1	0	4
4.	MCE13CE04	Business Economics and Finance Management	3	1	0	4
5.	MCE13CE05	Resource Management and Control in Construction	3	1	0	4
6.	MCE13CE06	Project Safety Management	3	1	0	4
7.	MCE13CE07	Construction of Bituminous Pavements	3	1	0	4
8.	MCE13CE08	Disaster Management	3	1	0	4
9.	MCE13CE09	Construction Planning, Scheduling and Control	3	1	0	4
10.	MCE13CE10	Maintenance And Rehabilitation Of Structures	3	1	0	4
11.	MCE13CE11	Quality Control and Assurance in Construction	3	1	0	4
12.	MCE13CE12	Energy Conservation Techniques in Building Construction	3	1	0	4
13.	MCS13AE04	Management Information Systems	3	1	0	4



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MCE13C002

CONSTRUCTION EQUIPMENTS

3 1 0 4

OBJECTIVE

- To study the various construction equipment in construction field.

UNIT I : CONSTRUCTION EQUIPMENT MANAGEMENT

12 Hrs

Identification – Planning - Equipment Management in Projects - Maintenance Management – Replacement – Unit Operating Cost - Cost Control of Equipment - Depreciation Analysis – Safety Management

UNIT II : EQUIPMENT FOR EARTHWORK

15 Hrs

Fundamentals of Earth Work Operations - Earth Moving Operations - Types of Earth Work Equipment - Tractors, Motor Graders, Scrapers, Front end Waders, Earth Movers

UNIT III: OTHER CONSTRUCTION EQUIPMENT

12 Hrs

Equipment for Dredging, Trenching, Tunneling, Drilling, Blasting - Equipment for Compaction - Erection Equipment - Types of pumps used in Construction - Equipment for Dewatering and Grouting – Foundation and Pile Driving Equipment

UNIT IV: MATERIALS HANDLING EQUIPMENT

9 Hrs

Forklifts and related equipment - Portable Material Bins – Conveyors - Hauling Equipment

UNIT V : EQUIPMENT FOR PRODUCTION OF AGGREGATE AND CONCRETING

12 Hrs

Crushers – Feeders - Screening Equipment - Handling Equipment - Batching and Mixing Equipment - Hauling, Pouring and Pumping Equipment – Transporters

Total No. of Hours: 60

REFERENCES

1. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., Construction Planning, Equipment and Methods, 5th Edition, McGraw-Hill, Singapore, 1995
2. Sharma S.C. Construction Equipment and Management, Khanna Publishers, New Delhi, 1988.
3. Deodhar, S.V. Construction Equipment and Job Planning, Khanna Publishers, New Delhi, 1988.
4. Dr.Mahesh Varma, Construction Equipment and its planning and Application, Metropolitan Book Company, New Delhi. 1983.



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MCE13C004

PROJECT FORMULATION AND APPRAISAL

3 1 0 4

OBJECTIVE

- To study the project financing, costing and payback period in construction project.

UNIT I : PROJECT FORMULATION

15Hrs

Generation and Screening of Project Ideas - Project identification – Preliminary Analysis, Market, Technical, Financial, Economic and Ecological - Pre-Feasibility Report and its Clearance, Project Estimates and Techno-Economic Feasibility Report, Detailed Project Report – Different Project Clearances required

UNIT II : PROJECT COSTING

10Hrs

Project Cash Flows – Time Value of Money – Cost of Capital

UNIT III: PROJECT APPRAISAL

15Hrs

NPV – BCR – IRR – ARR – Urgency – Pay Back Period – Assessment of Various Methods – Indian Practice of Investment Appraisal – International Practice of Appraisal – Analysis of Risk – Different Methods – Selection of a Project and Risk Analysis in Practice

UNIT IV: PROJECT FINANCING

10Hrs

Project Financing – Means of Finance – Financial Institutions – Special Schemes – Key Financial Indicators

UNIT V: PRIVATE SECTOR PARTICIPATION

10Hrs

Private sector participation in Infrastructure Development Projects - BOT, BOLT, BOOT - Technology Transfer and Foreign Collaboration - Scope of Technology Transfer

Total No. of Hours: 60

REFERENCES

1. Prasanna Chandra, Projects – Planning Analysis Selection Implementation & Review Fourth Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi., 1995
2. Joy P.K., Total Project Management - The Indian Context (Chapters 3 - 7), New Delhi, Macmillan India Ltd., 1992
3. United Nations Industrial Development Organisation (UNIDO) Manual for the preparation of Industrial Feasibility Studies, (IDBI Reproduction) Bombay, 1987
4. Barcus, S.W. and Wilkinson. J.W., Hand Book of Management Consulting Services, McGraw Hill, New York, 1986.



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MCE13C005

ADVANCED CONCRETE TECHNOLOGY

3 1 0 4

OBJECTIVE

- To study the properties of materials, tests and mix design for concrete.

UNIT I : CONCRETE INGREDIENTS

15Hrs

Composition of OPC – Manufacture – Modified Portland Cements – Hydration Process of Portland Cements – Structure of Hydrated Cement Pastes Mineral Admixtures – Slags – Pozzolanas and Fillers – Chemical Admixtures – Solutes – Retarders – Air Entraining Agents – Water Proofing Compounds – Plasticizers and Super Plasticizers Shape and Mechanical Properties – Absorption and Physical Durability – Chemical Stability – Packing Characteristics

UNIT II: FRESH CONCRETE

15Hrs

Workability – Mix Proportioning – Mixes incorporating Fly-ash, Silica fume, GGBS – Mixes for High Performance Concrete – Mix Design methods – variations in concrete strength.

UNIT III: HARDENED CONCRETE

10Hrs

Interfacial Transition Zone – Fracture Strength – Mechanical Properties – High Strength Concrete – Shrinkage – Creep – Other Properties

UNIT IV: DURABILITY OF CONCRETE

10Hrs

Basic Consideration – Stability of Constituents – Chemical Attack – Corrosion of Reinforcing Steel

UNIT V : SPECIAL TOPICS

10Hrs

Manipulation of Strength of Concrete – Fibre Reinforced Concrete – Self Compacting Concrete – Polymer Concrete – Super Plasticized Concrete.

Total No. of Hours: 60

***Note: (Use of approved data books permitted)**

REFERENCES

1. Neville, A.M., Properties of Concrete, 4th edition, Longman, 1995.
2. Metha P.K.and Montreio P.J.M., Concrete Structure Properties and Materials, 2nd edition, Prentice Hall, 1998.
3. Mindass and Young, Concrete, Prentice Hall, 1998



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MCE13C006

CONSTRUCTION PROJECT MANAGEMENT

3 1 0 4

OBJECTIVE

- To study the various management techniques for successful completion of construction project.

UNIT I: THE OWNERS' PERSPECTIVE

12Hrs

Introduction - Project Life Cycle - Types of Construction - Selection of Professional Services - Construction Contractors - Financing of Constructed Facilities - Legal and Regulatory Requirements - Changing Environment of the Construction Industry - Role of Project Managers

UNIT II: ORGANIZING FOR PROJECT MANAGEMENT

12Hrs

Project Management - Trends in Modern Management - Strategic Planning and Project Programming - Effects of Project Risks on Organization - Organization of Project Participants - Traditional Designer-Constructor Sequence - Professional Construction Management - Owner-Builder Operation - Turnkey Operation - Leadership and Motivation for the Project Team - Interpersonal Behavior in Project Organizations - Perceptions of Owners and Contractors

UNIT III: DESIGN AND CONSTRUCTION PROCESS

12Hrs

Design and Construction as an Integrated System - Innovation and Technological Feasibility - Innovation and Economic Feasibility - Design Methodology - Functional Design - Physical Structures-Geo-technical Engineering Investigation - Construction Site Environment - Value Engineering - Construction Planning - Industrialized Construction and Pre-fabrication - Computer-Aided Engineering

UNIT IV : LABOR, MATERIAL AND EQUIPMENT UTILIZATION

12Hrs

Historical Perspective - Labor Productivity - Factors Affecting Job-Site Productivity - Labor Relations in Construction - Problems in Collective Bargaining - Materials Management - Material Procurement and Delivery - Inventory Control - Tradeoffs of Costs in Materials Management. - Construction Equipment - Choice of Equipment and Standard Production Rates - Construction Processes Queues and Resource Bottlenecks

UNIT V: COST ESTIMATION

12Hrs

Costs Associated with Constructed Facilities - Approaches to Cost Estimation - Type of Construction Cost Estimates - Effects of Scale on Construction Cost - Unit Cost Method of Estimation - Methods for Allocation of Joint Costs - Historical Cost Data - Cost Indices - Applications of Cost Indices to Estimating - Estimate Based on Engineer's List of Quantities - Allocation of Construction Costs Over Time - Computer Aided Cost Estimation - Estimation of Operating Costs.

Total No. of Hours: 60

REFERENCES

1. Chris Hendrickson and Tung Au, Project Management for Construction – Fundamental Concepts for Owners, Engineers, Architects and Builders, Prentice Hall, Pittsburgh, 2000.
2. Chitkara, K.K. Construction Project Management: Planning, Scheduling and Control, Tata McGraw-Hill Publishing Company, New Delhi, 1998.
3. Frederick E. Gould, Construction Project Management, Wentworth Institute of Technology, Vary E. Joyce, Massachusetts Institute of Technology, 2000.
4. Choudhury, S, Project Management, Tata McGraw-Hill Publishing Company, New Delhi, 1988.
5. Ernest E. Ludwig, Applied Project Engineering and Management, Gulf Publishing Company, Houston, Texas, 1988.
6. Harold Kerzner, Project Management – A Systems Approach to Planning, Scheduling and Controlling, CBS Publishers & Distributors, Delhi, 1988.



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MCS13AL01

COMPUTER APPLICATION LAB

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OBJECTIVE

- This course gives an exposure to students in utilizing the sophisticated Spread sheets programs, Estimation Software and other package programs.

1. Introduction about –software & Hardware.
2. Use of management software
3. Construction scheduling with software

Total No. of Hours: 30

REFERENCES

1. Feigenbaum ., L.,“ Construction scheduling with primavera project planner” Prentice Hall Inc., 1999.
2. Paulson, B.R, “Computer Applications in construction,”Mc Graw-hill, 1995.



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MCE13C007

ADVANCED CONSTRUCTION TECHNIQUES

3 1 0 4

OBJECTIVE

- To study and understand the latest construction techniques applied to engineering Construction.

UNIT I : SUB STRUCTURE CONSTRUCTION

15Hrs

Box jacking - pipe jacking - Under water construction of diaphragm walls and basement - Tunneling techniques - piling techniques - driving well and caisson - sinking cofferdam - cable anchoring and grouting - driving diaphragm walls, sheet piles - laying operations for built up offshore system - shoring for deep cutting - large reservoir construction with membranes and earth system - well points - dewatering and stand by plant equipment for underground open excavation.

UNIT II: SUPER STRUCTURE CONSTRUCTION FOR BUILDINGS

10Hrs

Vacuum dewatering of concrete flooring – concrete paving technology – techniques of construction for continuous concreting operation in tall buildings of various shapes and varying sections – launching techniques – suspended form work – erection techniques of tall structures, large span structures – launching techniques for heavy decks – insitu prestressing in high rise structures, aerial transporting handling erecting lightweight components on tall structures –

UNIT III: CONSTRUCTION OF SPECIAL STRUCTURES

15Hrs

Erection of lattice towers and rigging of transmission line structures – construction sequence in cooling towers, silos, chimney, sky scrapers, bow string bridges, cable stayed bridges – launching and pushing of box decks – Advanced construction techniques in offshore construction practice – construction sequence and methods in domes and prestress domes – support structure for heavy equipment and conveyor and machinery in heavy industries – erection of articulated structures, braced domes and space decks.

UNIT IV : REHABILITATION TECHNIQUES

10Hrs

Mud jacking grout through slab foundation - micropiling for strengthening floor and shallow profile - pipeline laying - protecting sheet piles, screw anchors - sub grade water proofing under pining

UNIT V : DEMOLITION

10Hrs

Advanced techniques and sequence in demolition and dismantling

Total No. of Hours: 60

REFERENCES

1. Robertwade Brown, Practical foundation engineering hand book, McGraw-Hill Publications, 1995
2. Patrick Powers. J., Construction Dewatering: New Methods and Applications, John Wiley & Sons, 1992
3. Jerry Irvine, Advanced Construction Techniques, CA Rocketr, 1984



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MCE13C008 COMPUTER APPLICATIONS IN CONSTRUCTION ENGINEERING AND PLANNING

3 1 0 4

OBJECTIVE

- To study and understand the hardware and software requirements of computer, Programming and scheduling techniques applied to construction engineering.

UNIT I : INTRODUCTION 10Hrs

Introduction to System Hardware-Languages-Database Management-Spread Sheets-Applications

UNIT II : OPTIMIZATION TECHNIQUES 15Hrs

Linear, Dynamic and Integer Programming-Branch and Bound Techniques-Application to Production Scheduling, Equipment Replacement, Material Transportation and Work Assignment Problems-Software Development

UNIT III : INVENTORY PROBLEMS 15Hrs

Deterministic and Probabilistic Inventory Models-Software Development

UNIT IV: SCHEDULING APPLICATIONS 10Hrs

PERT and CPM-Software Development - Use of Management Software

UNIT V : OTHER PROBLEMS 10Hrs

Decision Making-Bayes Theory-Simulation Models

Total No. of Hours: 60

REFERENCES

1. Bily E. Gillet., "Introduction to Operation Research" - A Computer Oriented Algorithmic Approach, Tata McGraw-Hill, 1990.
2. Paulson, B.R., "Computer Applications in Construction", McGraw-Hill, 1995.
3. Feigenbaum., L., "Construction Scheduling With Primevera Project Planner", Prentice Hall Inc., 1999.



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MCE13C009

SHORING, SCAFFOLDING AND FORMWORK

3 1 0 4

OBJECTIVE

- To study and understand the various types of scaffolding, formworks, shoring methods and technique.

UNIT I : PLANNING, SITE EQUIPMENT AND PLANT FOR FORM WORK

12Hrs

Overall Planning – Detailed Planning – Standard units – Corner units – Schedule for column formwork – Formwork elements – Planning at Tender stage – Development of basic system – Planning for maximum reuse – Economical form construction – Planning examples – Crane size, effective scheduling estimate – Recheck plan details – Detailing the forms.

Crane arrangement – Site layout plan – Transporting plant – Formwork beams – Formwork ties – Wales – Scaffold frames - Form accessories – Vertical transport table form work.

UNIT II : FORM MATERIALS AND PRESSURES ON FORMWORK

12Hrs

Lumber – Types – Finish – Sheathing boards - Working stresses – Repetitive member stress – Plywood – Types and grades – Textured surfaces and strength – Reconstituted wood – Steel – Aluminum Form lining materials – Hardware and fasteners – Nails in Plywood – Bolts lag screw and connectors – Bolt loads.

Pressures on Formwork - Concrete density – Height of discharge – Temperature – Rates of Placing – Consistency of concrete – Live loads and wind pressure – Vibration Hydrostatic Adjustment for non standard condition.

UNIT III : SHORES AND FORM DESIGN

12Hrs

Simple wood stresses – Slenderness ratio – Allowable loads – Tubular steel shores - Patented shores – Site Preparation - Size and spacing – Steel Tower Frames – Safety practices – Horizontal shores shoring for multistories – More concentrated shore loads - T-heads – Two tier wood shores – Ellis shores – Dayton sure grip and Baker Roos shores – Safway Symons shores – Beaver Advance shores - Dead shores – Raking and Flying shores Basic simplification – Beam formulas – Allowable stresses – Deflection bending lateral stability – Shear, Bearing – Examples in wall forms – Slab forms – Beam form – Ties, Anchors and Hangers – Column forms – DOKA forms - Examples in each.

UNIT IV: FORMWORK FOR BUILDINGS AND FAILURES

12Hrs

Location of job mill – Storage – Equipment – Footings – Wall footing – Column footings Sloped footings – Slab on grade and paving work – Highway and airport paving – Curb and Gutter forms – Wall forms – External vibration – Prefabricated panel systems – Giant forms curved wall forms – wall openings joints – Tolerance for walls – Erection practices – Column heads – Beam or girder forms – Beam pockets – Suspended forms – Suggested Tolerances – Flying system forms – CECO Meyer flange and long forms.

Causes of failures – Inadequate shoring - Inadequate bracing of members – Improper vibration – Premature stripping – Errors in design – Failure to follow codes – How formwork affects concretes quality – ACI – Case studies – Planning for safety - Achieving economy – Finish of exposed concrete surface - Design deficiencies - Safety factors – Reshore installation – Prevention of rotation – Stripping sequence – Advantage of reshoring.



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UNIT V: DOME FORMS, TUNNEL FORMS, SLIPFORMS AND SAFETY PRACTICES FOR SCAFFOLDS

12Hrs

Shells of translation and revolution - Hemispherical – Parabolic - Barrel vaults - Hyperbolic Paraboloid Shells – Conoidal Shells - Folded plates – Shell form design – Building the form – Placing concrete – Strength requirements – Tunnel forming components – Curb and Invert forms – Arch and Wall forms - Telescopic forms – Concrete placement methods – Cut and Cover construction – Continuous Advancing slope method - Bulk head method – General design considerations influence of placing equipment – Tolerances – Form construction for Shafts.

Slipforms – Principles – Types – Advantage – Functions of various components – Planning of Slipform operations – Desirable characteristics of concrete – Common problems faced – Safety in slip forms - Special structures built with Slipform Technique – Codal provisions – Types of scaffolds – Putlog and Independent scaffold – Single pole scaffolds – Fixing ties – Spacing of ties - Plan Bracing – Knots – Safety nets – General safety requirements – Precautions against particular hazards – Truss, Suspended – Gantry and system scaffolds.

Total No. of Hours: 60

REFERENCES

1. Robert L. Peurifoy and Garold D. Oberlender, “Formwork for Concrete Structures”, Third Edition McGraw-Hill, 1996.
2. Hurd, M.K., “Formwork for Concrete”, Special Publication No. 4 Sixth Edition, American Concrete Institute, Detroit, 1995.
3. Michael P. Hurst, “Formwork”, Construction Press, London and New York, 1997.
4. Austin, C.K., “Formwork for Concrete”, Cleaver – Hume Press Ltd., London 1996.
5. Tudor Dinescu and Constantin Radulescu, “Slipform Techniques”, Abacus Press, Turn Bridge Wells, Kent, 1992.
6. “Guide for Concrete Formwork”, American Concrete Institute Detroit, Michigan, 1996.
7. “Safety Requirements for Scaffolding”, American National Standards Institute, New York, 1994.



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MCE13SL01

STRUCTURAL ENGINEERING LAB

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OBJECTIVE

- Students should get good knowledge about various tests conducted for concrete.

1. Tests on Cement -Consistency, Setting Times, Soundness, Compressive Strength.
2. Workability Test on Fresh Concrete
3. “E” value for concrete.
4. Casting of Reinforced concrete beams for conducting flexure and shear tests.
5. Bending test on steel flat
6. Testing of various types of reinforcement using mechanical and electrical strain gauges.
7. Creep and Shrinkage.
8. Permeability of Concrete.
 - a. Rapid chloride Penetration Test,
 - b. Freeze and Thaw test,
 - c. Acid test ,
 - d. Alkali aggregate reaction test
 - e. VCC testingf. fire resistance
 - g. Autoclaving
9. Non Destructive Testing Of Concrete.
 - a. Ultra Sonic Pulse velocity Test,
 - b. Rebound Hammer test
 - c. Cover Meter
 - d. Rebar Locator
 - e. Concrete Analyzer

Total No of Hours: 30

REFERENCES

1. Purushothaman, P, Reinforced Concrete Structure Structural Elements : Behaviour Analysis and Design , Tata Mc Graw Hill, New Delhi 1986.
2. Varghese, P.C., Limit State Design of Reinforced Concrete, Prentice Hall of India New Delhi, 1995.
3. Krishna Raju, N.Advanced Reinforced Concrete Design, CBS Publishers and New Delhi Distributors, 1986.
4. Neville, A.M., Properties of Concrete , Pitman Publishing Limited, London.
5. Shetty M.S., Concrete Technology, S.Chand and Company Ltd. Delhi.



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MCE13CE03

CONSTRUCTION PERSONNEL MANAGEMENT

3 1 0 4

OBJECTIVE

- To study the various aspects of manpower management in construction.

UNIT I : MANPOWER PLANNING

10 Hrs

Manpower Planning, Organizing, Staffing, directing, and controlling – Personnel Principles

UNIT II : ORGANISATION

15 Hrs

Organization – Span of Control – Organization Charts – Staffing Plan - Development and Operation of human resources - Managerial Staffing – Recruitment – Selection - Placement, Training and Development.

UNIT III: HUMAN BEHAVIOUR

10 Hrs

Introduction to the field of people management - basic individual psychology; motivation - Job design and performance management - Managing groups at work - self-managing work teams - intergroup behaviour and conflict in organisations – Leadership - Behavioural aspects of decision-making; and communication for people management

UNIT IV: WELFARE MEASURES

10 Hrs

Compensation – Safety and health – GPF – EPF – Group Insurance – Housing - Pension – Laws related to welfare measures.

UNIT V: MANAGEMENT AND DEVELOPMENT METHODS

15 Hrs

Compensation - Wages and Salary, Employee Benefits, employee appraisal and assessment - Employee services - Safety and Health – Discipline and discharge - Special Human resource problems, Performance appraisal. - Employee hand book and personnel manual - Job descriptions and organization structure and human relations – Productivity of Human resources.

Total No. of Hours: 60

REFERENCES

1. Carleton Counter II and Jill Justice Coutler, The Complete Standard Handbook of Construction Personnel Management, Prentice-Hall, Inc., New Jersey, 1989.
2. Memoria,C.B., Personnel Management, Himalaya Publishing Co., 1992.
3. Josy. J. Familiaro, Handbook of Human Resources Administration, McGraw-Hill International Edition, 1987.
4. Pringle Charles, Management Longenecker Emerricle Publishing Company, 1981.
5. R.S. Dwivedi, Human Relations and Organisational Behaviour, BH – 1987.



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MCE13CE04 BUSINESS ECONOMICS AND FINANCE MANAGEMENT

3 1 0 4

OBJECTIVE

- To study the role and methods of economics and finance concepts applied to construction business.

UNIT I : ECONOMICS

10 Hrs

Role of Civil Engineering in Industrial Development – Advances in Civil Engineering - Engineering Economics – Support Matters of Economy as related to Engineering – Market demand and supply – Choice of Technology – Quality control and Quality Production – Audit in economic law of returns governing production.

UNIT II : CONSTRCUTION ECONOMICS

10 Hrs

Construction development in Housing, transport and other infrastructures – Economics of ecology, environment, energy resources – Local material selection – Form and functional designs – Construction workers – Urban Problems – Poverty – Migration – Unemployment – Pollution.

UNIT III : FINANCING

18 Hrs

The need for financial management - Types of financing – short term borrowing – Long term borrowing – Leasing – Equity financing – Internal generation of funds – External commercial borrowings – Assistance from government budgeting support and international finance corporations – Analysis of financial statements – Balance Sheet - Profit and Loss account – Cash flow and Fund flow analysis – Ratio analysis – Investment and financing decision – Financial Control – Job Control and centralized management.

UNIT IV: ACCOUNTING METHOD

12 Hrs

General Overview – Cash basis of a accounting – Accrual basis of accounting – Percentage completion method – Completed contract method – Accounting for tax reporting purposes and financial reporting purposes.

UNIT V: LENDING TO CONTRACTORS

10 Hrs

Loans to Contractors – Interim construction financing – Security and risk aspects.

Total No. of Hours: 60

REFERENCES

1. Warneer Z Hirsch, Urban Economics, Macmillan, New York, 1993.
2. Prasanna Chandra, Project Selection, Planning, Analysis, Implementation and Review, Tata McGraw-Hill Publishing Company, 1995.
3. Kwaku A, Tenah and Jose M.Guevara, Fundamental of Construction Management and Organisation, Prentice – Hall of India, 1995.
4. Halpin, D.W., Financial and Cost Concepts for Construction Management, John Wiley & Sons, New York, 1985.
5. Madura, J and Veit, E.T., Introduction to Financial Management, West Publishing Co., St. Paul, 1988.



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MCE13CE06

PROJECT SAFETY MANAGEMENT

3 1 0 4

OBJECTIVE

- To study and understand the various safety concepts, requirements applied to construction projects.

UNIT I : CONSTRUCTION ACCIDENTS

15 Hrs

Accidents and their Causes – Human Factors in Construction Safety - Costs of Construction Injuries – Occupational and Safety Hazard Assessment – Legal Implications

UNIT II : SAFETY PROGRAMMES

10 Hrs

Problem Areas in Construction Safety – Elements of an Effective Safety Programme – Job-Site Safety Assessment – Safety Meetings – Safety Incentives

UNIT III : CONTRACTUAL OBLIGATIONS

10Hrs

Safety in Construction Contracts – Substance Abuse – Safety Record Keeping

UNIT IV: DESIGNING FOR SAFETY

15 Hrs

Safety Culture – Safe Workers – Safety and First Line Supervisors – Safety and Middle Managers – Top Management Practices, Company Activities and Safety – Safety Personnel – Subcontractual Obligation – Project Coordination and Safety Procedures – Workers Compensation

UNIT V : OWNERS' AND DESIGNERS' OUTLOOK

10 Hrs

Total No. of Hours: 60

REFERENCES

1. Jimmy W. Hinze, Construction Safety, Prentice Hall Inc., 1997
2. Richard J. Coble, Jimmie Hinze and Theo C. Haupt, Construction Safety and Health Management, Prentice Hall Inc., 2001
3. Tamilnadu Factory Act



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MCE13CE09 CONSTRUCTION PLANNING, SCHEDULING AND CONTROL 3 1 0 4

OBJECTIVE

- To study and understand the concept of scheduling and the techniques necessary for construction project.

UNIT I : CONSTRUCTION PLANNING 12 Hrs

Basic Concepts in the Development of Construction Plans - Choice of Technology and Construction Method - Defining Work Tasks - Defining Precedence Relationships Among Activities - Estimating Activity Durations - Estimating Resource Requirements for Work Activities - Coding Systems

UNIT II: SCHEDULING PROCEDURES AND TECHNIQUES 12 Hrs

Relevance of Construction Schedules - The Critical Path Method - Calculations for Critical Path Scheduling - Activity Float and Schedules - Presenting Project Schedules - Critical Path Scheduling for Activity-on-Arrow and with Leads, Lags, and Windows - Calculations for Scheduling with Leads, Lags and Windows - Resource Oriented Scheduling - Scheduling with Resource Constraints and Precedences - Use of Advanced Scheduling Techniques - Scheduling with Uncertain Durations - Calculations for Monte Carlo Schedule Simulation - Crashing and Time/Cost Tradeoffs - Scheduling in Poorly Structured Problems - Improving the Scheduling Process.

UNIT III: COST CONTROL, MONITORING AND ACCOUNTING 12 Hrs

The Cost Control Problem - The Project Budget - Forecasting for Activity Cost Control - Financial Accounting Systems and Cost Accounts - Control of Project Cash Flows - Schedule Control - Schedule and Budget Updates - Relating Cost and Schedule Information.

UNIT IV : QUALITY CONTROL AND SAFETY DURING CONSTRUCTION 12 Hrs

Quality and Safety Concerns in Construction - Organizing for Quality and Safety - Work and Material Specifications - Total Quality Control - Quality Control by Statistical Methods - Statistical Quality Control with Sampling by Attributes - Statistical Quality Control with Sampling by Variables - Safety

UNIT V: ORGANIZATION AND USE OF PROJECT INFORMATION 12 Hrs

Types of Project Information - Accuracy and Use of Information - Computerized Organization and Use of Information - Organizing Information in Databases - Relational Model of Databases - Other Conceptual Models of Databases - Centralized Database Management Systems - Databases and Applications Programs - Information Transfer and Flow.

Total No. of Hours: 60

REFERENCES

1. Chitkara, K.K. Construction Project Management: Planning, Scheduling and Control, Tata McGraw-Hill Publishing Company, New Delhi, 1998.
2. Calin M. Popescu, Chotchai Charoengnam, Project Planning, Scheduling and Control in Construction: An Encyclopedia of terms and Applications, Wiley, New York, 1995.
3. Chris Hendrickson and Tung Au, Project Management for Construction – Fundamental Concepts for Owners, Engineers, Architects and Builders, Prentice Hall, Pittsburgh, 2000.
4. Moder, J., C. Phillips and E. Davis, Project Management with CPM, PERT and Precedence Diagramming, Van Nostrand Reinhold Company, Third Edition, 1983.
5. Willis, E. M., Scheduling Construction Projects, John Wiley & Sons, 1986.
6. Halpin, D. W., Financial and Cost Concepts for Construction Management, John Wiley & Sons, New York, 1985.



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MCE13CE10 MAINTENANCE AND REHABILITATION OF STRUCTURES 3 1 0 4

OBJECTIVE

- To study the damages, repair and rehabilitation of structures.

UNIT I : GENERAL

12 Hrs

Quality assurance for concrete construction as built concrete properties strength, permeability, thermal properties and cracking.

UNIT II : INFLUENCE ON SERVICEABILITY AND DURABILITY

12 Hrs

Effects due to climate, temperature, chemicals, wear and erosion, Design and construction errors, corrosion mechanism, Effects of cover thickness and cracking, methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings, cathodic protection.

UNIT III: MAINTENANCE AND REPAIR STRATEGIES

12 Hrs

Definitions : Maintenance, repair and rehabilitation, Facets of Maintenance importance of Maintenance Preventive measures on various aspects Inspection, Assessment procedure for evaluating a damaged structure causes of deterioration - testing techniques.

UNIT IV : MATERIALS FOR REPAIR

12 Hrs

Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, ferro cement, Fibre reinforced concrete.

UNIT V : TECHNIQUES FOR REPAIR

12 Hrs

Rust eliminators and polymers coating for rebars during repair foamed concrete, mortar and dry pack, vacuum concrete, Guniting and Shotcrete Epoxy injection, Mortar repair for cracks, shoring and underpinning.

Total No. of Hours: 60

REFERENCES

1. Denison Campbell, Allen and Harold Roper, "Concrete Structures", Materials, Maintenance and Repair, Longman Scientific and Technical UK, 1991.
2. R.T.Allen and S.C.Edwards, "Repair of Concrete Structures", Blakie and Sons, UK, 1987.



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MCE13CE12 ENERGY CONSERVATION TECHNIQUES IN BUILDING CONSTRUCTION
3 0 0 4

OBJECTIVE

- To study the various energy saving and management techniques applied to building and construction with relevance to environment.

UNIT I : INTRODUCTION

12 Hrs

Fundamentals of energy- Energy Production Systems-Heating, Ventilating and Airconditioning – Solar Energy and Conservation – Energy Economic Analysis – Energy conservation and audits – Domestic energy consumption – savings - challenges –primary energy use in buildings - Residential – Commercial – Institutional and public buildings – Legal requirements for conservation of fuel and power in buildings.

UNIT II : ENVIRONMENTAL

12 Hrs

Energy and resource conservation – Design of green buildings – Evaluation tools for building energy – Embodied and operating energy – Peak demand – Comfort and Indoor Air quality – Visual and acoustical quality – Land, water and materials – Airborne emissions and waste management.

UNIT III: DESIGN

12 Hrs

Natural building design consideration – Energy efficient design strategies – Contextual factors – Longevity and process Assessment – Renewable Energy Sources and design – Advanced building Technologies – Smart buildings – Economies and cost analysis.

UNIT IV: SERVICES

12 Hrs

Energy in building design – Energy efficient and environment friendly building – Thermal phenomena – thermal comfort – Indoor Air quality – Climate, sun and Solar radiation, - Psychometrics – passive heating and cooling systems - Energy Analysis – Active HVAC systems - Preliminary Investigation – Goals and policies – Energy audit – Types of Energy audit – Analysis of results – Energy flow diagram – Energy consumption / Unit Production – Identification of wastage- Priority of conservative measures – Maintenance of energy management programme.

UNIT V: ENERGY MANAGEMENT

12 Hrs

Energy management of electrical equipment - Improvement of power factor – Management of maximum demand – Energy savings in pumps – Fans – Compressed air systems – Energy savings in Lighting systems – Air conditioning systems – Applications – Facility operation and maintenance – Facility modifications – Energy recovery dehumidifier – Waster heat recovery – Steam plants and distribution systems – Improvement of boiler efficiency – Frequency of blow down – Steam leakage – steam Flash and condense return.

Total No. of Hours: 60

REFERENCES

1. Moore F., Environmental Control system Mc Graw Hill, Inc. 1994.
2. Brown, GZ, Sun, Wind and light: Architectural design strategies, John Wiley & Sons,1985.
3. Cook, J, Award – Winning passive Solar Design, Mc Graw Hill, 1984.
4. J.R. Waters, Energy conservation in Buildings: A Guide to part L of the Building Regulations, Blackwell Publishing, 2003.



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MCE13CE08

DISASTER MANAGEMENT

3 1 0 4

UNIT I : INTRODUCTION TO DISASTERS

12 Hrs

Concepts, and definitions-Disaster, Hazard, Vulnerability, Resilience, Risks Disasters: Classification, Causes, Impacts -including social, economic, political, environmental, health, psychosocial, etc.)

UNIT II: RISK MANAGEMENT

12 Hrs

Goals and objectives of ISDR Programme- Risk identification – Risk sharing – Disaster and development: Development plans and disaster management –Alternative to dominant approach –disaster-development linkages –Principle of risk partnership.

UNIT III: RISK REDUCTION

12Hrs

Trigger mechanism – constitution of trigger mechanism – risk reduction by education – disaster information network – risk reduction by public awareness Application of various technologies: Data bases – RDBMS – Management Information systems – Decision support system and other systems – Geographic information systems Remote sensing-an insight – contribution of remote sensing and GIS - Case study.

UNIT IV : INTER-RELATIONSHIPS BETWEEN DISASTERS AND DEVELOPMENT 12 Hrs

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources financial arrangements – areas of improvement –disaster preparedness — emergency response.

UNIT V: DISASTER RISK MANAGEMENT IN INDIA

12 Hrs

Hazard and Vulnerability profile of India Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programmes and legislation)

Total No. of Hours: 60

TEXT BOOKS

1. Pardeep Sahni, Madhavi malalgoda and ariyabandu, “Disaster risk reduction in south asia”, PHI
2. Amita sinvhal, “Understanding earthquake disasters” TMH, 2010.

REFERENCE

1. Pardeep sahani, Alka Dhameja and Uma medury, “Disaster mitigation: Experiences and reflections”, PHI