M.Arch./M.Tech.(Construction Management)
COURSE STRUCTURE

M.Arch.M.Tech.(Construction Management)
COURSE STRUCTURE

FIRST SEMESTER

Course No.	Course Title	L/ Stu/wk	Marks			Credits
			Int.	End	Total	
1.1	Economy in construction & infrastructure development	4	50	50	100	4
1.2	Construction Contracts & Contracting	4	50	50	100	4
1.3	Construction Accounts	4	50	50	100	4
1.4	Project Management Techniques	4	50	50	100	4
1.5	Management Technology & Organization	4	50	50	100	4
1.6	Information technology in construction	4	50	50	100	4
1.7	Construction practice workshop	3	--	*50	50	3
1.8	Managerial skills workshop	3	--	*50	50	3
	TOTAL		**300**	**400**	**700**	**30**

Note: *End Examination shall be a practical exam with Viva-voce.

FIRST SEMESTER

1.1 ECONOMY IN CONSTRUCTION AND INFRASTRUCTURE DEVLOPMENT

Objective of the course is to introduce students to basic concepts of economics, broad features of Indian economy and the economic framework of the construction industry and infrastructure development

Scope of economics, Mechanism of supply and demand.

Micro Economics – National Income, GNP, GDP, Population, Employment and work force.

Broad features of national economy: Industry Banks and Financial Institutions.
Construction Industry – Nature, Characteristics, Size and Structure.

Role in Economic development and employment generation. Input industries, clients, contractors, consultants and workers and their organisations.

Indices – Wholesale price index, Consumer Price Index, Construction Cost Indices, Escalation.

Status of Infrastructure in India - Housing and civic services urban infrastructure in India.

Issues in Developing, funding and managing infrastructure. International and national constraints and incentives.

1.2 CONSTRUCTION CONTRACTS & CONTRACTING

To study the legal context within which construction contracts are established, documents that make up the contract, contracting process, office engineering and contracts administration.

CONTRACT DOCUMENTATION:
Description, need, evolution. Types of contracts and rationale thereof. Merits & demerits of various types of contracts. Roles and responsibilities of various parties involved in the contract.

CONTRACT CONDITIONS:
Interpretation by parties to contract. Obligations and responsibilities of the parties. Protection and indemnification. Bonds and assurances, laws and liens. Social aspect in contract conditions and risk evaluation.

EPC CONTRACTS:
Turnkey and BOT family contracts. Study of all these forms of contracts, financial agreements, roles and responsibilities of parties, contract risks etc-.

CONTRACT LAWS:
Indian contract act, Indian Arbitration act. Case law. Claims and dispute settlement. Arbitration.

OFFICE ENGINEERING:
Estimating project costs, Defining scope and procedures of procurement of design, engineering, construction and project management services, procurement of plant and equipment. Preparation of tender documents and invitation to tender. Preparation and submission of bids. Bidding process. Award of work, contract payment, contract close-outs and completion.

CONTRACT DOCUMENTATION:
CPWD contract condition document, world bank procurement procedure documents, FIDIC document, Ministry of finance documents.

1.3 CONSTRUCTION ACCOUNTS

Students will learn accounting as the language of business, acquire a grasp of financial procedures for broad based management responsibilities and project accounts.

Basic financial accounting concepts and methods.

Basic concepts: capital and revenue, financial accounting, cost accounting, management accounting and financial management.

ACCOUNTING PROCESS:
GAPP, double entry system, ten point programme in book keeping, journal, ledger, cash book, trial balance, final balance, depreciation, provisions and reserves.

Profit and loss account sheets and balance sheets.

BUDGETING:
Types of budgets, procedure for master budget, cash flow forecasts. Budgetary control system.

Financial ratios.

PROJECT ACCOUNTS:
Preparation of contract accounts for each project. Methods of recording and reporting site accounts to project office from project office to head office.

1.4 PROJECT MANAGEMENT TECHNIQUES

To learn project management techniques: planning, scheduling, monitoring and control. Methods of time and cost management.

Classification of levels. Work breakdown structure. Assessing duration, costing activity.

CPM, PERT Network analysis: Network elements, Analysis Procedure, PERT vs CPM.
Project work scheduling: Object of scheduling, Bar chart schedule, Network schedule, Line and balance schedule, Time limited and resource limited schedule, schedule hierarchy.

Resource forecasting, manpower planning, material planning, material procurement schedule, planning and selection of equipment.

Cost planning and scheduling: classification of costs, standard cost, financial forecasting, budgeting.
Resource Productivity Controlling: Labour productivity control, Material wastage control, Equipment activity control, Productivity improvement measures.
Project cost control: Control approach, direct cost control, budgetary control, contribution control, control responsibility.

Project time control: Time monitoring methodology, reviewing time progress, Time cost relationship.

1.5 MANAGEMENT THEORY AND ORGANISATION

Objective of the course is to introduce students to the theory of general management and organization systems as a framework of the professional practice of construction management.

Evolution of management: Britain, Europe, America, China, Japan & India. Role of culture, technology, economics and social systems.

Introduction into Organization theory:
Enterprise as an organization, organization behaviour, motivation, communication, authority & leadership. Effect of technology, markets, information technology, globalization & structure of the organization.

Management Processes & Functions:
Planning, organizing, staffing, leading & controlling. Marketing, production procurement, personnel, materials, engineering & R & D.

Management styles:
Management of service enterprises, R & D & consulting organizations,

Management grid & Organization management, specific management issues. Management and society. Global management.

1.6 INFORMATION TECHNOLOGY IN CONSTRUCTION

Objective of the course is to familiarise the students with the basic computer concepts, operating systems, various application software and their usage in construction.

Introduction to basic computer hardware, peripherals and operating systems; Office application software MS Office incl. MS Word, MS Excel and MS PowerPoint; Application software used at various stages of a construction project e.g. software used for cost estimation, contract management, billing etc.;

COMPUTERS: CONCEPTS & HARDWARE
Introduction to various computer environment, single & multiple user systems and workstations, operating systems & software's, data processing systems, computer architecture, hardware components (input, output & storage devices), PC features

MICROSOFT WINDOWS
Features, concepts and useful commands

APPLICATION SOFTWARE'S - CONCEPTS & APPLICATION
MS Office, AutoCAD, 3D studio, Adobe Photoshop.

1.7 CONSTRUCTION PRACTICE WORKSHOP
(New Materials and Methods)

The objective of Construction Practice Workshop is to give hands-on experience in the practice of building trades, operation of construction machinery and doing construction. The students spend about 4 hours per week at building sites. They may work as masons, plumbers and carpenters, handle vibrators, operate dozers, dumpers etc.

They do measurement, costing and estimating, prepare bill of quantities, tender documents and do quality inspections and learn the application of various Standards to construction processes. Students must equip themselves with safety helmets and boots at their own cost. The practice is supervised by experienced trainers on the sites. CWP are credit courses.

Students are required to undergo training in First-aid and gain a Certificate from the Competent Authority.

1.8 MANAGERIAL SKILLS WORKSHOP

MSW is an important part of the curricula. It gives hands-on experience in the following skills required of a manager.

- Communication skills - audio visual and inter personal.

- Listening skills, show and tell skills and skills to manage difference.

- Social skills.

- Skills in dealing with selected work groups: clients, construction workers, government inspectors, trade unionists.

- Skills in understanding the socio-political state of projects and groups.

Group assignments, audio-visual presentations, mock sessions, visits to labour colonies, understanding work in government offices, formal social events are some of the indicators of what goes into MSW. Any expenses on the account of MSW will be borne by the students, if any.

Students are required to undergo English language test. Colleges organises extra sessions on week-ends, on actual payment basis to improve English language for the students weak in English.

SECOND SEMESTER

Course No.	Course Title	L/ Stu/wk	Marks			Credits
			Int.	End	Total	
2.1	Construction Personnel Management	3	50	50	100	3
2.2	Materials and Equipment Management	3	50	50	100	3
2.3	Construction Finance Management	3	50	50	100	3
2.4	Construction Safety Management	3	50	50	100	3
2.5	Construction Quality Management	3	50	50	100	3
2.6	Marketing Construction Services & Products	3	50	50	100	3
2.7	Case Study	3	50	50	100	3
2.8	Information Technology in Construction	3	50	50	100	3
	TOTAL	**24**	**400**	**400**	**800**	**24**

SECOND SEMESTER

2.1 CONSTRUCTION PERSONNEL MANAGEMENT

The course aims to develop competence to manage human resource and enhance its potential in the interest of individual of the organisation. A student is exposed to aspects concerning human performance and its capabilities that are inherent in a professional cognizant of his / her responsibilities towards organisation and the society

Concepts of organisational and individual behaviour; Perception and attitudes; Motivation concepts and processes; Group behaviour and teams; Communication process and information management; Conflict management; Leadership; Nature of organisations; Organisational development; Principles of organisation structure; Human resource policies & practices; Selection, training and assessment; Performance Appraisal; Training need assessment and dissemination of training; Participative management; HRM trends; Philosophies of values, morals and ethics; Societal responsibilities and good citizenry; Good practices and managerial responsibilities.

2.2 MATERIALS AND EQUIPMENT MANAGEMENT

To acquire knowledge and skills necessary for the efficient management of construction materials at site and stores. Students will learn the strategies and techniques of planning, selecting and other aspects of managing the construction inputs.

Construction Equipment Management:
Importance and role in the construction industry. Various types of equipments used in construction: earthmoving, pile driving, road construction, concrete placing etc-. their techniques and performance characteristics in relation to the jobs in hand.

Selection, planning and matching of construction plant and equipment with emphasis on site application, site layout, financing, hire-purchase options, owning and operation charges, economic replacement. Equipment management organization, repairs and maintenance.

Construction Materials Management:
Importance, scope, objective and functions of material management. Integrated approach to materials management.

Materials of construction: classification, codification, ABC analysis, standardization, substitution, variety reduction.

Estimating of materials requirement, phasing of their procurement.

Procurement: identification of sources, vendor analysis, purchase procedure, legal aspects of purchasing, transporting of materials. Transportation modes.

Inventory/Stock control: importance, models, EOQ.

Stores Management: Stores organization, stores layout, receipts and inspection, issue of materials. Care and safety in handling. Store records and store accounting.

2.3 CONSTRUCTION FINANCE MANAGEMENT

Introduction to financial management
Realm and scope of financial management; Issues in Financial management of construction Projects and construction companies.

Business Organisation, financial Institutions and Project Financing in India
Forms of business organisations: Sole proprietorship, partnership, Private limited companies, public limited companies, Joint stock companies, corporations, financial institutions in India; Various financial institutions (IDBI, ICICI, IFCI, etc.), Frame work and functions, Polices and norms, Financial procedures, Appraisal methods and financial indictors, Long term financing methods; Money markets and capital market, Equity capital, debentures, Bonds, mutual funds, Suppliers credit, Government subsidies, Unsecured loans and deposits,

National and Construction Sector economics
National economics: Features and characteristics of Indian economy, liberalization of economy, wholesale price indices, consumer price indices, construction cost indices and inflation, G. D. P., management economics.

Construction sector economics: Construction economics and factors affecting construction sector. Role of construction industry in national economy, export, international contracts, concept of demand, supply and profit.

Financial accounting and budgeting.
Financial accounting: Generally accepted accounting principles (GAAP), Book keeping based on current AVC principles, Various types of accounting and accounting procedures.

Budgeting: Different types of budgets, Budgetary controls, Performance budgeting

Time value of money, valuation, risks and returns.
Time value of money; Simple and compound interest, Future value and present value, Effective annual interest rate, Annuity / perpetuity, Amortizing loans, Effective annual interest rates.

Valuation of long-term securities: Book value/ Market value/ intrinsic value/ Liquidation value
Risk and return: Correlation between risk and return

Taxation, depreciation and inflation
Taxation: Corporate taxation under Indian laws, Taxes on profit / capital gains/ Capital Transfer, Tax planning and payment of tax, Tax incentive and tax policies

Depreciation; Common methods of depreciation, Standard depreciation values (Buildings, Equipments), Economic life/ Salvage value/ Book value of assets

Inflation; Assessment for investment decisions

Financial analysis and planning
Understanding and analyzing financial statements; Statutory requirements for accounts and audit (Companies act), Construction and analysis of balance sheet, profit and loss account and fund flow statement.

Tools for financial analysis; Ratio analysis for financial conditions, Ratio analysis for financial Performance, Five basic types of financial ratios, (Liquidity, Leverage Coverage. Activity, Profitability), Case studies of Financial statements of Indian companies.

Cash flow forecasting of projects: Prerequisites for cash flow forecasting, Preparations for cash flow statement, Use of S- curve, Composite cash flow statements (Multiple Projects), Cost of borrowing, Self financing contracts,

Working capital management
Definition and components of W. C, Cash management, Receivable management, Payable management, Inventory management, Estimating the requirements of W. C, Working capital management of construction companies

Capital budgeting procedures and techniques
Project appraisal and selection process of independent projects; Traditional methods of appraisal, discounted cash flow methods.

2.4 CONSTRUCTION SAFETY MANAGEMENT

To gain knowledge in the importance of safety in construction and skills to manage safety at workplaces.

Concept: pschycological, physiological and technological factors in safety in construction.

Hazards and causes of accidents, safety measures. Safety legislation and standards for construction industry.

Safety in construction of buildings, civil works and infrastructure development projects.

Management of accidents, employment injuries and occupational hazards/diseases.

Safety organization, site management. Role of safety department, safety officer, safety committee. Safety training, incentives and monitoring.

Safety organization site management. Role of safety department, safety officer, safety committee. Safety training, incentives and monitoring.

Writing safety manuals, preparing safety checklists and inspection reports.

2.5 CONSTRUCTION QUALITY MANAGEMENT

The intent of the course is to give an insight into the concepts of Quality Management System and further develop applications relevant to planning, design & construction of buildings.

Quality concepts and stakeholder concerns for building and construction; Evolution of modern concept of Quality management process approach; Quality assurance & control; Quality management system and ISO 9000 : 2000 requirements; Quality system standards for construction elements; Inspections & tests; Quality management tools; Environmental Management System Standards and their application in construction; EMS - QMS relationships; Concept and philosophy of TQM; Quality circle, Quality cost; Practical aspects of quality control of building projects. Good practices and managerial responsibilities.

Introduction to concept of quality in building design, construction, project management; standard definition of quality; Deming's principles; Special features of construction vs. manufacturing sector; Organisation for quality management

Quality of building facilities and stakeholders concerns, quality responsibilities and commitment of Architect, consultant, project managers and contractors

Product quality inspections and tests, Problems of rework, wastage and compromise in product quality approach, Problems of inspections/test oriented approach in service quality; systems approach to quality

Evolution of modern concepts of quality management; quality system and quality control approaches; advantages of quality systems approach; quality systems concepts for building design, construction and management activities; Quality systems standards of BS 5750/ QS 9000 series and their evolution

ISO 9000 Quality system standards (family discussion); applicability of ISO 9000 series standards world-wide, India and Indian Building sector; Elements of ISO 9000 series standards Quality systems standards elements; Aspects of quality control & assurance of major building items like RCC, brickwork, woodwork, steelwork, flooring, finishing, internal water supply, sanitary electrical services, external services like roads, sewers et.; quality of maintenance works, checklists.

Quality System standards elements; proposed revision of ISO9000-2000 Standards of quality management system; Contractual implications of quality systems

Quality cost; Quality system and Total Quality Management philosophy as applied to building sector; Human resource management for TQM;

Business Process Re-engineering; Benchmarking; Partnering; Quality Circles Quality Function Deployment; Just in Time technique ISO 900 Quality system standards and ISO 14000 series - Environmental Management System standards; ISO 14000 standards as applied to building projects; Environment impact assessment for environmental quality

2.6 MARKETING CONSTRUCTION SERVICES AND PRODUCTS

To provide orientation to marketing construction projects, industrial marketing and real estate marketing.

Business environment: planning and development framework in India, analysis of resources allocation, technology and socio-political factors, supplier and market factors, implications of globalization, deregulation and liberalization.

Marketing environment: impact of external and internal environment on marketing, SWOT analysis; socio-economic, demographic, political, technological, legal environment, nature and impact of completion on market strategy.

Definition and scope of industrial marketing: difference between consumer marketing and industrial marketing; product vs marketing orientation; marketing mix elements; marketing organization structure; societal role of marketing.

Features and characteristics of construction projects, products and services, corporate policies, market segmentation.

Marketing projects; tender preparation, differentiation between estimating and tendering; base bid ,project over-head general and administrative, mark up (margin), tendering models (low-bid, average bid ,statistical bidding , negotiations etc.

Marketing real estate: marketing segmentation, product development, pricing strategies, communication strategies, legal aspects of marketing real estate, integration of production and marketing systems.

Case studies of scientific project marketing.

Impact of liberalization and globalization on project marketing; joint ventures, collaborations and alliances, BOT, BOOT and other methods of financial packaging.

2.7 CASE STUDY 2

Familiarisation with the building projects
To identify various aspects of project and study their impact on sequence of work operations, general approach to construction, resource requirements (material, labour, equipment and infrastructure), requirements of specialised inputs etc.

Conceptualise Construction Logic
To conceptually work out alternatives of construction sequence logic. The alternatives shall take into consideration the project and site constraints, design requirements, services interaction, resource requirements etc. Identified in the above step.

Work breakdown Structure
To strategically break down the project into work packages. To identify an appropriate approach of work breakdown for the project based on ease of co-ordination, cost savings etc.

Identification of activities, Milestones and construction sequencing
To form a hierarchy of networks by identifying detailed activities, milestones and arranging them in correct construction logic based on milestones and breakdown levels.

Calculation of quantities, cost and productivity data
To determine the time duration, cost and labour/equipment resources of all activities in the project.

Time calculation of AON-PERT Network
To calculate the time duration of the project.

Cost on Time Graph and Crashing
To prepare cost on time graph for the project and to determine cost of crashing the time duration.

Resource Histograms and Resource Levelling
To study the deployment a pattern, sudden peaks and lows on resource histograms for crucial resources of the project

2.8 INFORMATION TECHNOLOGY IN CONSTRUCTION

Objective of the course is to familiarise the students with the application software and their usage in construction.

A comprehensive coverage to the project management software MS Project and its application for project planning, scheduling and monitoring of projects and communication technologies which are the need of the day for creating an appropriate MIS between all the agencies involved in the construction projects i.e. concepts of internet facilities and their interface with other software.

PROJECT MANAGEMENT APPLICATIONS

Project Management Software's
MS Project 2000 and Primavera Project Planner – Principles of planning, scheduling and management for: -

Project modelling, work break down structure, Time management, Resource Management, Cost management, Project monitoring & Updation, Earned Value System, filtering & viewing project information & their customisation, Reports & customisation, Internet support, Co-ordination & communication management, Real Time Working, Connectivity/interface with other software's/databases, Database manipulation & customisation, Advanced features & applications.

System approach to Project Management
Systems approach to project management, application for other project management functions, project management information system (PMIS), concentric project management system

THIRD SEMESTER

Course No.	Course Title	L/ Stu/wk	Marks			Credits
			Int.	End	Total	
3.1	Internship		100	100	200	
	TOTAL		**100**	**100**	**200**	

THIRD SEMESTER

3.1 INTERNSHIP

The objective of this course is to define the job specification for a project management organisation and give guidance on the project manager's role in various life cycle phases of a project.

The intent of the course is to define the scope and responsibilities of project management organisation, various models for procurement of PM Service, standard consultancy agreement forms, fee structure, code of professional practice and ethics. Good practices and managerial responsibilities.

FOURTH SEMESTER

Course No.	Course Title	L/ Stu/wk	Marks			Credits
			Int.	End	Total	
4.1	Legal Frame Work of Construction	3	50	50	100	
4.2	International Contracting & Project Exports	3	50	50	100	
4.3	Building Services & O&M Management	3	50	50	100	
4.4	Elective	3	50	50	100	
4.5.1	Building Automation & Intelligent Building					
4.5.2	Infrastructure Development Project Management					
4.5.3	PPP & SEZ in urban Infrastructure Development					
4.5	Research Thesis		150	150	300	
	TOTAL	**15**	**350**	**350**	**700**	

FOURTH SEMESTER

4.1 LEGAL FRAME WORK OF CONSTRUCTION

The objective of the course is to provide an overview of all laws and regulations related to construction projects in the various stages of the project cycle.

The coverage includes Building regulation and bylaws of local authorities. Laws related to land development. Land acquisition, lease & easement rights, property acts and urban land ceiling and regulation act. Permits and approvals for construction activities; statutory requirements and clearance related to environment impact, urban form, fire regulation, completion certificate. Laws and legislation related to construction Industry labour laws, The building and construction workers (regulation of employment and conditions of service) Act, 1996, workmen's compensation Act, Payment of wages Act, The employees provident fund and Miscellaneous provisions Act 1996 etc.

Types of disputes in construction contracts and methods of dispute resolution processes. Alternative dispute resolution and dispute review mechanisms. Arbitration and conciliation Act 1996. Managerial approach to dispute minimisation, Conduct of Arbitration proceedings, Making of Arbitration award and Termination proceedings, powers of arbitrator, case studies of arbitration awards, setting aside of awards and enforcement of awards, appeal and revision and court proceedings.

4.2 INTERNATIONAL CONTRACTING AND PROJECT EXPORTS

To expose the students to various aspects of international contracting and impart knowledge and skills about the methods and procedures of working in international construction markets and turkey projects.

International contracting: meaning, scope, nature, types, distinctive features.

Review of the international construction markets, market share of various countries, role of india in these markets particularly since the 70's.

Methods and techniques of exploratory studies of potential markets; country profiles, market studies, feasibility studies, project reports etc.

Rules and procedures of project exports from India: RBI, EXIM Bank, ECGC, financial institutions, banking rules, guidelines of project exports.

International finance: financial institutions and their role in host countries, World Bank, IMF, ADB, African Bank, bilateral and barter trade, countertrade practices, alliances and joint venturing, ECB.

International project management – procurement and management, Bidding for international contracts-methods and strategies, joint ventures, collaborations, consortia.

Risk Management: political currency, labour, etc. reparation of funds, personnel and equipments.

International projects-special features and methods of handling them, social implications of working abroad. Problems in rehabilitation of 'Returned' personnel.

Case studies of American, European, Japanese and Indian export projects.

4.3 BUILDING SERVICES AND O&M MANAGEMENT

The objective of the course is to cover fire safety services and fire safety management in buildings and in the context of large residential and institutional complexes to cover the external electrical services communication system and civil infrastructure facilities.

Fire safety would include fire detection & alarm systems; fire protection systems; study of codes and standards. The electrical infrastructure services would cover substations, substation equipments, and power distribution systems, standby and alternate power supply system. The communications would cover CCTV system, telecommunication and related information technology based facilities. Coverage on civil infrastructure services for the residential and institutional complexes include planning, design, construction and maintenance of external development works such as water supply, sewerage, solid wastes, roads and storm water drainage, including raw water harvesting methods. Emphasis is also given for the management of design and construction co-ordination of these infrastructure services through project management techniques. Good practices and managerial responsibilities.

13.1 FIRE SAFETY SERVICES.

13.1.1 Introduction to fire safety: causes of fire, fire process, fire development and growth, fire loads, concepts of fire safety.

13.1.2 Means of escape: Objectives, exits, travel distance, protected escape routes, refuge signage etc.

13.1.3 Compartmentalisation: objectives, compartment size, construction requirements, openings, external fire, spread, protection of equipment.

13.1.4 Structural fire protection: Objectives, performance of materials, requirements of building components.

13.1.5 Active fire safety systems: Fire detection, fire suppression, system reliability,

13.1.6 Smoke control: Objectives smoke control, application of buildings, HVAC systems, and pressurisation.

13.1.7 Fire safety standards: fire safety codes/ standards, fire test.

13.1.8 Fire fighting equipment, rescue, external access, fire fighting shafts and elevators.

13.1.9 Fire risk and assessment: fire hazard analysis, fire safety audits.

13.1.10 Fire safety management: fire safety management, fire safety, costs, problems in urban areas and slums.

13.2 ELECTRICAL INFRASTRUCTURE

13.2.1 Space requirements for substation installations; substation equipment selection criteria; power distribution system and installations; street lighting; security lighting; highway lighting; diesel generating (DG) system for standby supply; standby power integration in distribution system; devices for protection of electrical system; maintenance of electrical systems;

13.2.2 Demand load determination; capacitors and power factor; standard tariff plans; statuary obligation of consumers;

13.2.3 Low voltage systems: CCTV systems; telecom distribution system; LAN/WAN systems.

13.3 CIVIL INFRASTRUCTURE SERVICES

13.3.1 Water supply; sources, treatment; storage and distribution systems

13.3.2 Sewerage; sewer network and appurtenances, ground water re-charge systems.

13.3.3 Roads; road networks, geometrical standards, construction specifications and locations of services.

13.3.4 Solid wastes; collection, process and disposal system including recycling methods.

13.3.5 Design and construction and co-ordination of infrastructure services through network planning.

13.3.6 Maintenance of infrastructure services.

13.4 STUDIO PROGRAM:

The studio exercise shall be carried out to illustrate the coverage of the topic preferably on selected building and appraisal study of existing projects through site visits.

4.4 ELECTIVE

4.5.1 BUILDING AUTOMATION & INTELEGENT BUILDINGS

Automation, communication and security; mechanical, electrical, electronic subsystems and their integration with the building envelope; environment, energy and sustainability; configuration and operational characteristics; performance specifications; analytical models; design methods; case studies.

Principles of advanced control strategies in building automation and control systems; control theory, sensors, novel and mobile controllers, and their applications for air conditioning, fire safety, transportation and lighting control systems; formulation of control models and their numerical solutions.

4.5.2 INFRASTRUCTURE DEVELOPMENT PROJECT MANAGEMENT

This course addresses the main concepts and methodologies of infrastructure planning and management.

It aims to advance and enhance your skills and understanding of the diverse types of infrastructure assets planning and management, including the environmental, social, institutional assessments, and economic and financial aspects of infrastructure management.

what is infrastructure, the basic principles of infrastructure planning, condition assessment, monitoring of the condition of the asset, maintenance strategies, funds requirement, life cycle costing, annual budgeting for maintenance and rehabilitation, and prioritising maintenance strategies for optimum return on investment.

Site mobilization: Site reconnaissance, site lay out including sizing and location of infrastructure. Organizing utilities, Mobilizing manpower, materials, equipment, funds etc-.

Site Management: Implementing performance accounting, monitoring systems, waste. Prevention of malpractices, networking with other parties.

Health and welfare of workers, women workers. Project and the community.

Demobilization: Testing, commissioning, trial runs, final billing, maintenance manuals and guarantees, demobilization of men, materials, equipment etc-.

4.5.3 PPP & SEZ IN URBAN INFRASTRUCTURE DEVELOPMENT

This course addresses private finance in the construction industry and the role of sez's in urban development.

Evolvement of public private partnerships

Need for PPP's

Project Financing Models, Feasibility studies

Private finance initiative models: Meeting the investment challenge, strengthening long term partnerships.

Need for SEZ's, Government laws on SEZ's

Manpower requirement for SEZ's

Features of SEZ's:

generation of additional economic activity

promotion of exports of goods and services;

promotion of investment from domestic and foreign sources;

creation of employment opportunities;

development of infrastructure facilities.

4.5 RESEARCH THESIS

The objective of research methodology is to impart the knowledge about process for undertakings research that students shall be expected to do through seminar.

Research area identification; hypothesis of research topic; literature souring and search; aim and objective definition; formulation of methodology; field study planning; survey data collection, analysis and result presentation; literature study; compilation and inference drawing; research study validation through case studies, field application and simulation models; discussion of findings of research findings; study conclusion and recommendation formulations.

The objective of the thesis is to provide an opportunity to the students to prepare independent and original study of a special project of his own choice.

The subject for special study may be conceptual or practical but pertaining to Building Engineering and Management. This should however, offer scope to adopt a fresh approach in formulating a concept or developing a methodology effective and useful. Each student will prepare the Thesis under the guidance of a principal advisor with regular reviews by the faculty of the department. The Thesis will be presented in the accepted form of a thesis report duly supported by copious References, sketches, graphs, statistical data, details of survey if any, detailed account of experimental / analytical procedures adopted. Each student is required to defend his Thesis at a Viva Voce Examination by jury.

1. Building Engineering
2. Construction technology
3. Energy efficient building materials and techniques
4. Construction project management
5. Time management
6. Cost management
7. Quality management
8. Safety management
9. Contract Administration
10. Design management
11. Construction financial management
12. Human resource management
13. Quantitative techniques
14. Energy management
15. Building services
16. Building management systems
17. Infrastructure services
18. Management information systems
19. Project planning and feasibility